

EXPORT NUMBER

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CANADIAN MACHINERY

AND MANUFACTURING NEWS

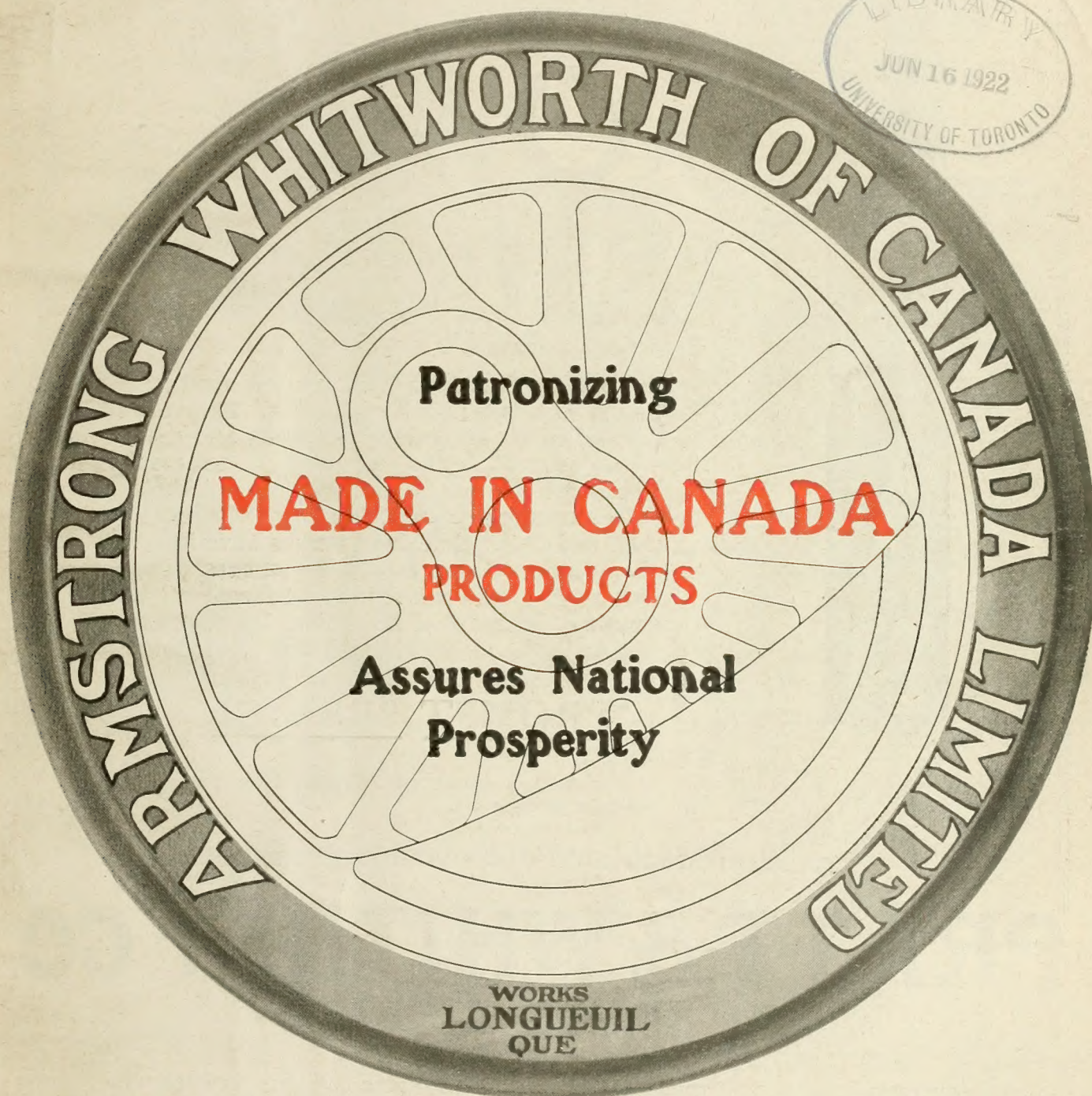
A weekly newspaper covering in a practical manner the mechanical power, foundry and allied fields.

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MONTREAL

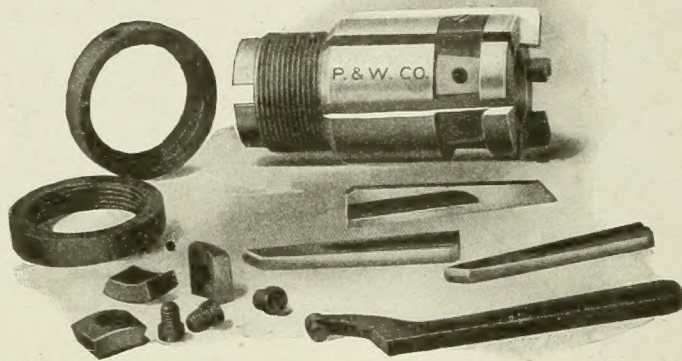
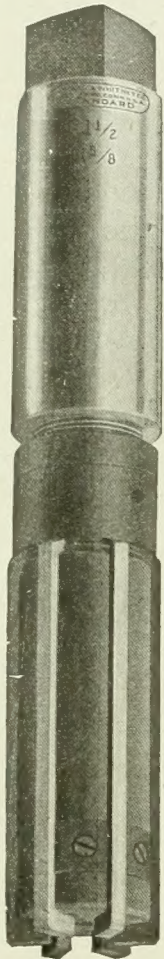
TORONTO

HAMILTON

WINNIPEG

SMALL TOOLS

P. & W. Adjustable BLADE REAMERES



These reamers have eccentric relief and can be set to size without regrinding. They are unexcelled for design and simplicity and ease of adjustment. The eccentrically relieved blades are stronger than others, do not chatter, and produce a smoother hole. The hand, shell and fluted chucking reamers have interchangeable nuts, screws and wrenches. The bottom of a hole can readily be faced. By a simple adjustment of the blades the reamers can easily be set to size without regrinding.

PROMPT SERVICE

Small Tools are carried in stock. Place your order there to-day.

Precision Machine Tools--Standard and Gauges

PRATT & WHITNEY CO.

OF CANADA, LIMITED

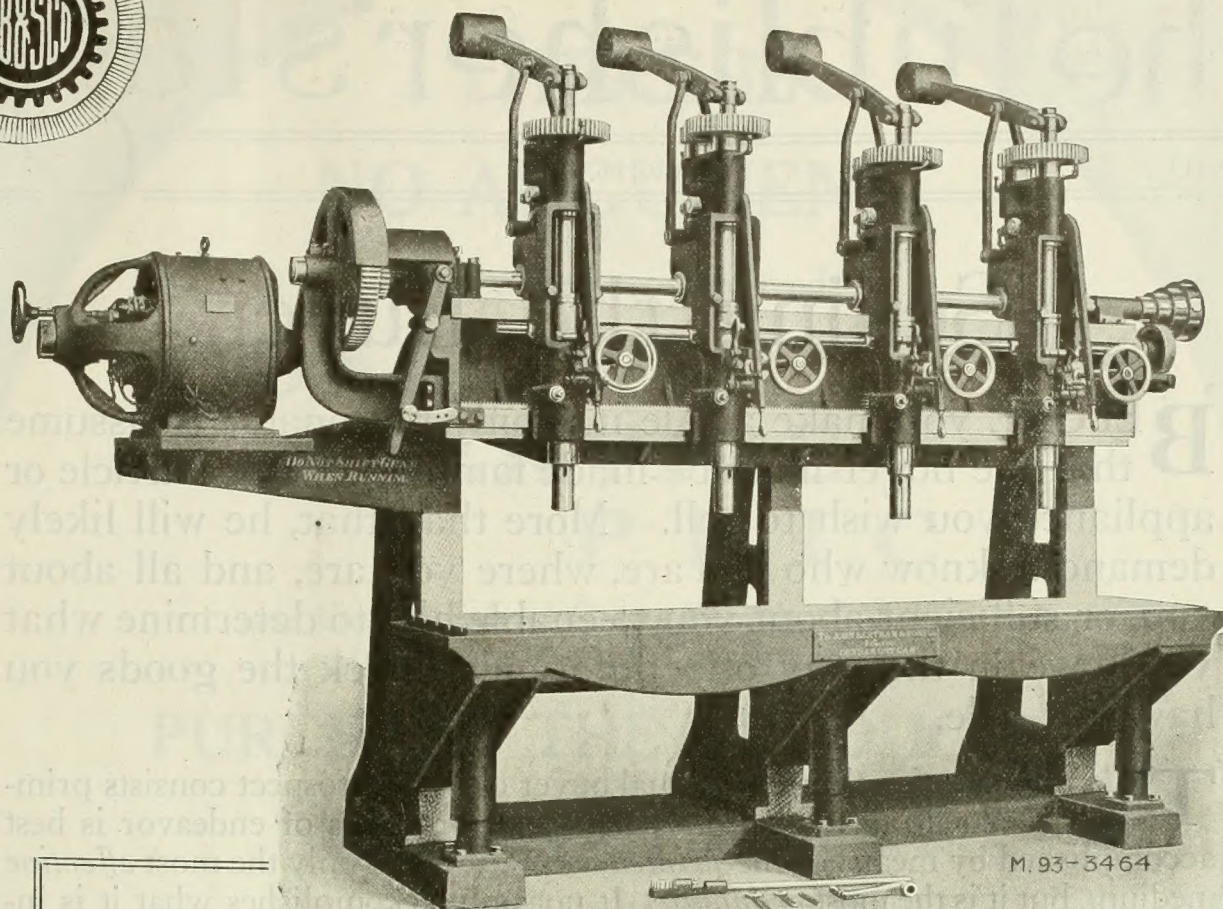
Works: DUNDAS, ONTARIO

MONTREAL
723 Drummond Bldg.

TORONTO
1002 C.P.R. Bldg

WINNIPEG
1205 McArthur Bldg.

VANCOUVER
B.C. Equipment Co.



Multiple Drills OF EVERY DESCRIPTION

**Bertram 4-Spindle Multiple Drilling Machine
for Locomotive and Other Work**

SIMULTANEOUS OR INDEPENDENT FEEDS with INDEPENDENT KNOCK-OFF FOR EACH HEAD AND CLUTCH DRIVE FOR EACH SPINDLE.

CAPACITY, FOUR 2-inch HOLES IN STEEL.

Drop us a line for photographs and full particulars.

**The John Bertram & Sons Company
Limited**

DUNDAS, ONTARIO, CANADA

MONTREAL
723 Drummond Bldg.

TORONTO
1002 C.P.R. Bldg.

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609 Bank of Ottawa Bldg.

WINNIPEG
1205 McArthur Bldg.



The Publisher's Page

TORONTO

MARCH 6, 1919

Selling the Buyer

BEFORE you make a sale it is only reasonable to assume that the buyer must be made familiar with the article or appliance you wish to sell. More than that, he will likely demand to know who you are, where you are, and all about you, or sufficient about you to enable him to determine what you have in the way of reputation to back the goods you have for sale.

THE process of making an actual buyer out of a prospect consists primarily in educating him. Education in all branches of endeavor is best accomplished by means of the *printed word*. It is not only the most *effective* medium, but it is the most *economic*. It not only accomplishes what it is intended to do, but it does it with the least possible expense.

IN every branch of commercial and industrial life we have to-day the *technical* or trade journals. Only the unthinking underestimate the power of those educative mediums. Their rapid growth and increasing circulation alone are convincing evidence of their usefulness. They are specialists in their respective fields of endeavor.

They are the great disseminators of practical information and trade news. Their clientele is made up of sober, thinking, ambitious, responsible mechanics and business men. The idly curious and irresponsible do not read them.

IT is because the technical journal is educational in character that so many manufacturers recognize in it the ideal medium for *educating* their army of probable buyers and customers to understand and appreciate the merits of their respective lines. It is because of this recognition and as a result of it that the advertisements of to-day are so vastly superior to the advertising of a few years ago, when, perhaps, the pulling power and value of the printed word was not so generally appreciated.

Quality

Service

THERE IS NO ARGUMENT

When you are assured

QUALITY SERVICE P R I C E

and One Hundred Cents Worth of Value
for Every Dollar You Spend

PURCHASE THE PRODUCTS OF CANADIAN MILLS

A Canadian Dollar is Worth One Hundred Cents in Canada

THE
STEEL COMPANY
OF
CANADA
LIMITED
HAMILTON MONTREAL



STEEL RAILS

Open Hearth Quality
(All Sections from 12 lbs
to 100 lbs per yard)

SPLICE BARS

STEEL TIE PLATES

PIG IRON

BASIC, FOUNDRY-
BESSEMER

SULPHATE OF AMMONIA



BLOOMS, BILLETS, SLABS,

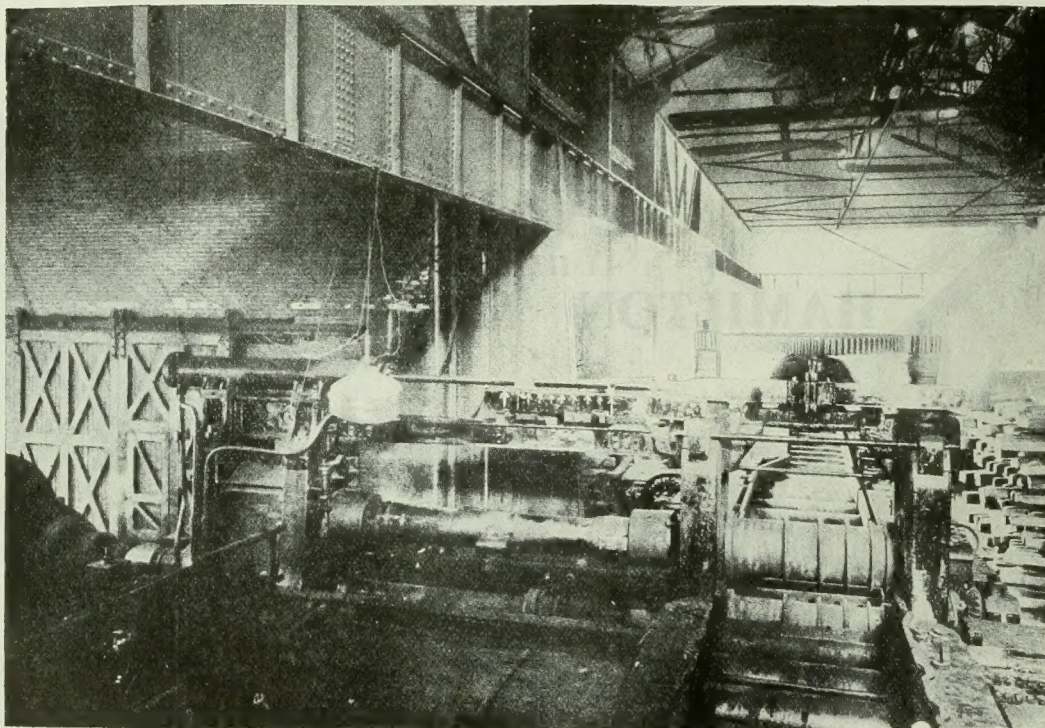
STRUCTURAL STEEL

MERCHANT BARS

CONCRETE REINFORCING BARS

IRON, BRASS AND BRONZE CASTINGS

Sulphuric Acid. Nitre Cake.



ALGOMA STEEL CORPORATION, LIMITED
SAULT STE. MARIE, ONTARIO

BRIDGEFORD

Heavy Duty Axle Lathes

TO the mechanical official who judges a machine strictly on its merits — "Bridgeford" means a Heavy Duty Lathe which is relied upon to maintain high production and to keep costs uniformly low.

That applies to the Bridgeford line throughout — Engine Lathes — Axle Lathes — Journal Truing Lathes — so that in practically every railroad shop of importance "Bridgefords" handle the lion's share of the difficult heavy turning.

In big plants like the Cambria Steel Company, of Johnstown, Pa., where axle production is on a basis of efficient quantity production, batteries of Bridgefords are kept busy day and night. That these machines have not cost the Cambria Company a nickel for repairs in three years of forced production, is responsible for the recent installation of another large battery of "Bridgefords."

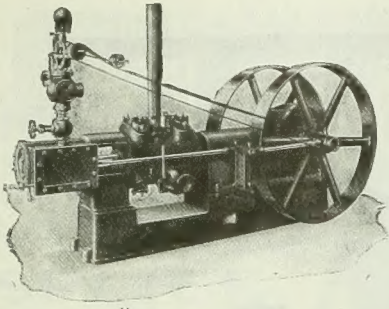
Your demands may be exacting, but Bridgeford Lathes will meet them — your work may be difficult, but Bridgeford Lathes will handle it with ease and economy. Ask us for definite proof of the cost-cutting possibilities of these machines. We can show you a worth-while saving.

Made in sizes ranging from
24" to 72" swing.

BRIDGEFORD MACHINE TOOL WORKS

161 WINTON ROAD, ROCHESTER, N.Y., U.S.A.

Manufacturers of Heavy Duty Lathes for More Than 20 Years



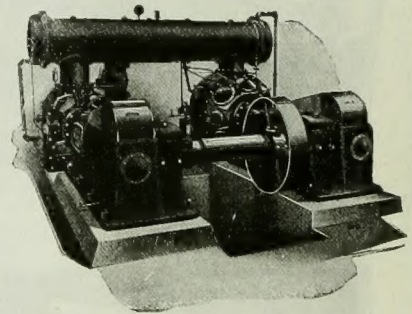
IT PAYS TO BUY A MODERN COMPRESSOR

**CANADIAN INGERSOLL-RAND COMPANY
LTD.**

Sydney, Sherbrooke, Montreal, Toronto, Cobalt
Winnipeg, Nelson, Vancouver

Economy in Upkeep

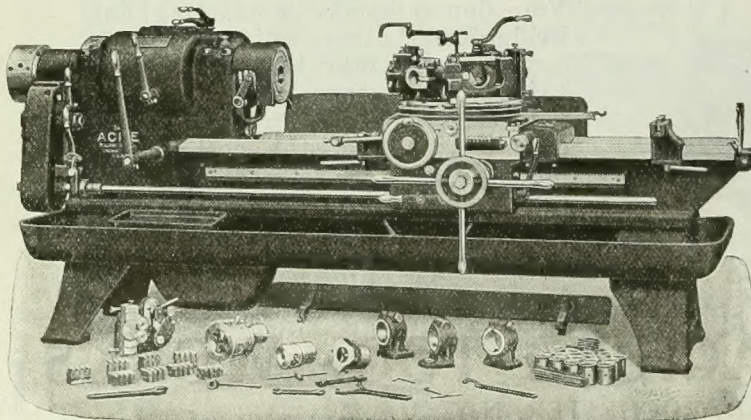
C-I-R-Co Air Compressors are all tested before leaving the Shop ; all sizes are designed for economical running. Flood lubrication is not only cleanly and thorough but low in cost. Modern valve design gives greater output per H.P., input; the efficient intercooler still further lowers the power cost.



Doubly Efficient—Does Both Bar and Chuck Work

This Cincinnati Acme Flat Turret Lathe is a double-production, geared head machine of the sliding gear type. It operates on minimum power because the only gears running are those doing the actual work.

This machine saves remarkable time and labor machining either bar work or chuck work up to 16 in. diameter.



3 1/4 in. x 36 in. Flat Turret Lathe Equipped for Bar Work.

Head is cast solid with the bed. You know what that means: accuracy, rigidity, constant and perfect alignment of spindle with vees, upon which the turret carriage travels.

We also make a full line of Screw Machines and Turret Lathes.

Write for Valuable Bulletin

**The Acme
Machine Tool Co.
Cincinnati, Ohio**

Canadian Agents: Rudel-Belnap Machinery Co., of Montreal and Toronto

WILT

HIGH SPEED AND CARBON TWIST DRILLS

*"Where
There's
a WILT
-There's the
Way:-"*

PERFORMANCE COUNTS

You can't fool the mechanic when it's a question of **Drills**. He knows what to expect of a good **Drill**. Give him a **WILT** and thus make another satisfied worker.

WILT Drills have a record of **satisfactory performance**, equal to any throughout the world.

Our guarantee to make good **always**, our policy of **the best in material and workmanship**, and our system of minute and careful inspection is reaping its reward in increased production for the manufacturer.

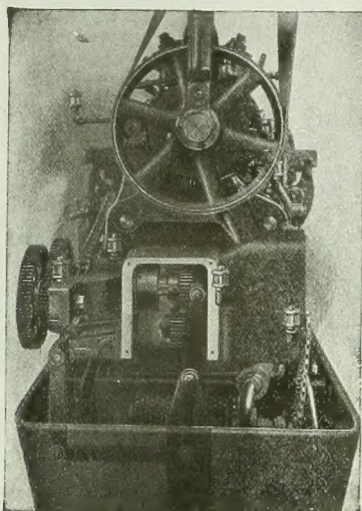
You should be using **WILT Products**. May we tell you why? Write us.

WILT TWIST DRILL CO. OF CANADA, LIMITED

Walkerville — Ontario

London Office: Wilt Twist Drill Agency, Moorgate Hall,
Finsbury Pavement, London, E.C. 2, Eng.

THE JOHNSON FRICTION CLUTCH



Courtesy National Acme Co., Cleveland, Ohio.

WATCH

is subject to exceptional hard usage, but it gives unfailing service.

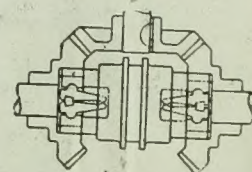
YOUR MACHINE

should be equipped with clutches that will give just such satisfaction.

What are your requirements? Let us know. We maintain an engineering force to work out all clutch installations. They will co-operate with you.

Write for our Yellow Data Sheets and Booklet,
"Clutches as Applied in Machine Building"

AGENTS: CANADA—Williams & Wilson, 320 St. James St., Montreal; The Canadian Fairbanks-Morse Co., Ltd., Montreal and Branches. ENGLAND—The Eftandem Co., Ltd., 22 Newman St., Oxford St., London, W. 1, Sole Agents for British Isles. AUSTRALIA—Edwin Wood Pty., Hdwe. Chambers, 231 Elizabeth Street, Melbourne, Victoria. JAPAN—Andrews & George Co., 10 Takegawacho, Kiobashiku, Tokyo. SOUTH AFRICA—D. Drury & Co., Main Street, Johannesburg. FRANCE—Anciens Etab. Glaenzer & Perreaud, 18 Fauborg du Temple, Paris.



Double Clutch in Nest of Gears

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

**Coal
Coke
Iron Ore**

Pig Iron
Victoria

FOUNDRY & MALLEABLE

Made by The Canadian Furnace Co.
Port Colborne, Ontario, Canada

M.A. HANNA & Co.

Sales Agents, CLEVELAND

Canadian Office:

904 C.P.R. Bldg., Toronto

FIRTH'S Speedicut ^{HIGH} SPEED Steel
The Ideal Steel for Machining Shells

FIRTH'S CARBON TOOL STEELS
Standard Brands Highest Quality

THOS. FIRTH & SONS, Limited, Sheffield, England

CANADIAN WAREHOUSES | 449 St. Paul St. West, MONTREAL
79 West Adelaide St., TORONTO

J. A. SHERWOOD
Canadian Manager

LOCOMOTIVE CASTINGS

CANADIAN STEEL FOUNDRIES, LIMITED
Transportation Building
MONTREAL



**Swedish Steel & Importing
Co., Limited**

Montreal
New York

Toronto
Denver

Direct representa-
tives of foremost
Swedish mills:
makers of

Tool Steels

ALLOY STEELS, BILLETS,
BARS, DISCS, SHEETS,
HIGH SPEED STEELS,
DRILL RODS, DRAWN
BARS, SEAMLESS TUB-
ING, COLD ROLLED STRIP
STEEL, WELDING WIRE,
WROUGHT AND ROLLED
IRON, PIG IRON, STEEL
AND IRON ENDS, HOL-
LOW AND SOLID MINING
DRILL STEEL.



PROMPT SHIPMENTS
from large stock



Forging Billets and Bars

Electric Furnace, Alloy Steels

Die Blocks

Annealed—Heat Treated

Piston Rods

Rough Turned—Annealed—Heat
Treated

High Speed Steel

General Steel Company

Milwaukee, Wisconsin

DETROIT—823 Dime Bank Building

If any advertisement interests you, tear it out now and place with letters to be answered.

FORD-SMITH MILLERS

No. 2 Plain

24" x 19" x 7½"

No. 3 Plain

34" x 20" x 10"

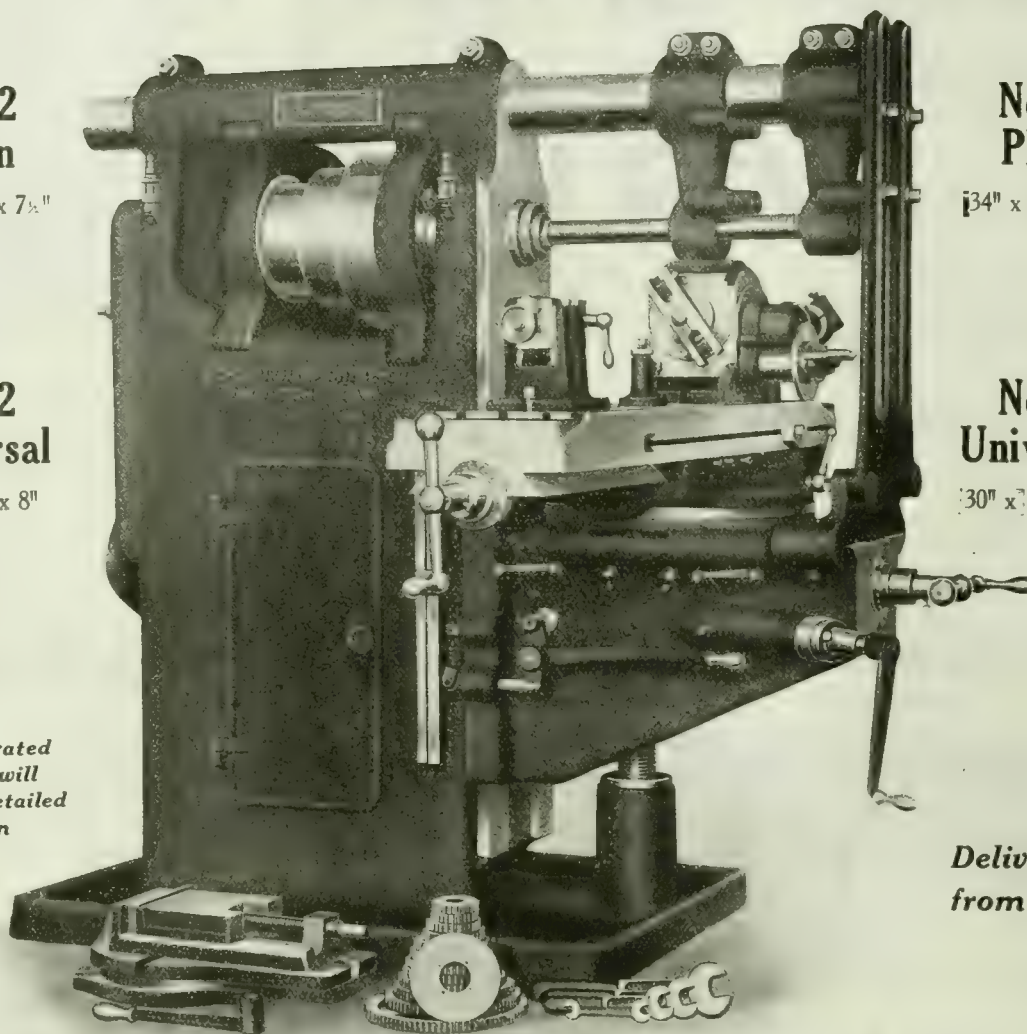
No. 2 Universal

25" x 17" x 8"

No. 3 Universal

30" x 19" x 10"

*Our Illustrated
Catalogue will
give you detailed
information*



*Deliveries
from Stock*

FORD-SMITH No. 3 UNIVERSAL

FORD-SMITH MILLERS have stood the strenuous test of 24-hour-a-day service during the last four years. They have won a reputation for the highest accuracy. Their simplicity of design and convenience of operation are apparent from above illustration. Let us quote you on your Miller requirements.

The Ford-Smith Machine Company, Limited

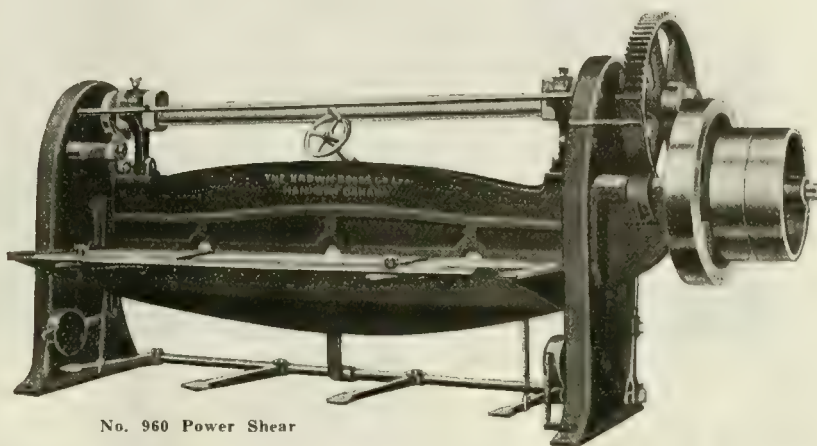
*Manufacturers in Canada of
Milling Machines, Grinders, Machine Tools*

Hamilton - Ontario - Canada

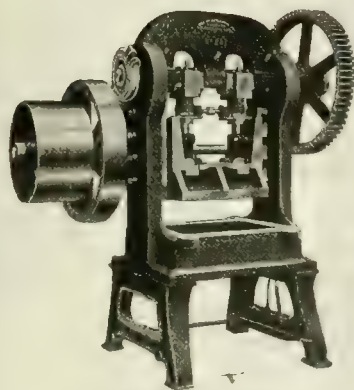
*Agents : W. E. STOREY, 3 Arundel Street, LONDON, England
Foreign Agents : ALF. HERBERT, LIMITED, 24 Dey Street. NEW YORK
Branches in all Foreign Countries*



Stood The Test



No. 960 Power Shear



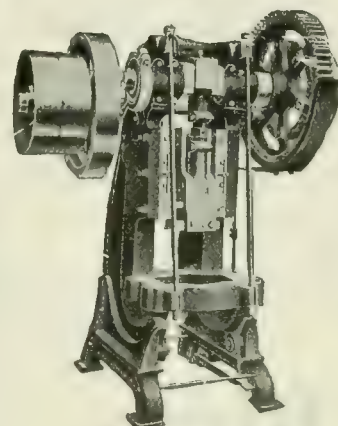
No. 20 1/2 Power Press

"B.B." Tools during the last four years have proven their superiority under the most trying conditions.

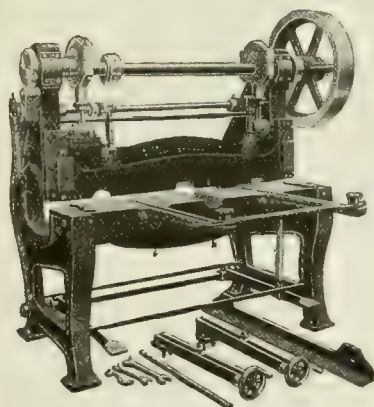
Inexperienced help and 24 hours' daily service will test the best machines.

Quality that is "*built in*" on a machine is bound to assert itself under such circumstances.

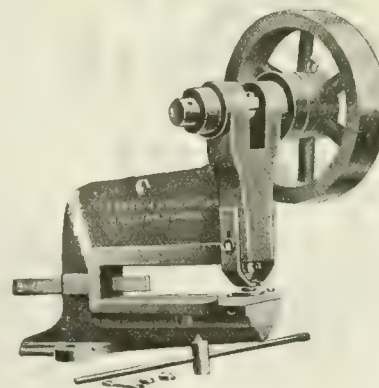
Our line comprises shears of all kinds, power presses for punching, forming, embossing, blanking, etc. Tin-smith's tools and sheet metal working machines of every description, also canners' and evaporators' machinery.



No. 215 Power Press



No. 404 Shear

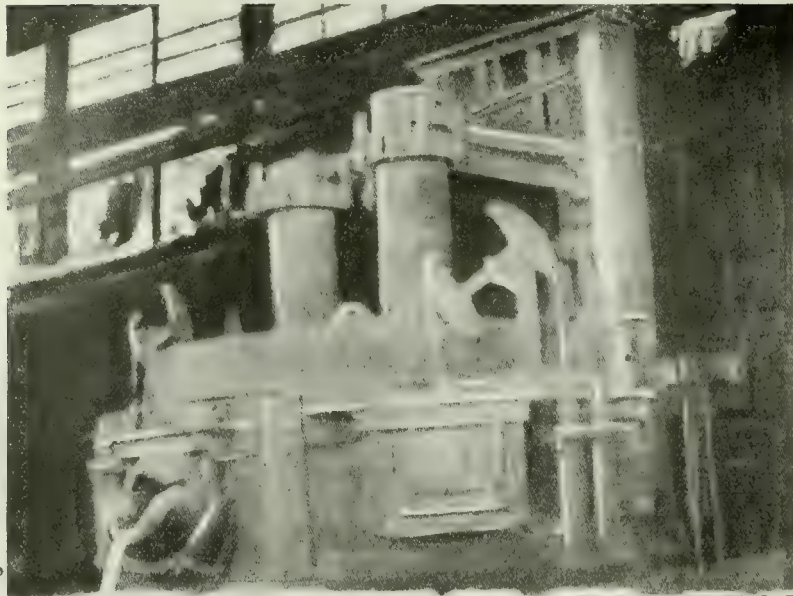


No. 100 Power Punch



The Brown-Boggs Co., Limited
Hamilton, Canada





ELECTRICITY

**High
Speed
Steel**

SEVERAL factors combine to make this high-speed steel a triumph of the steel-maker's art; Electric Furnaces--entirely infallible, automatically regulated, delivering the same result time after time.

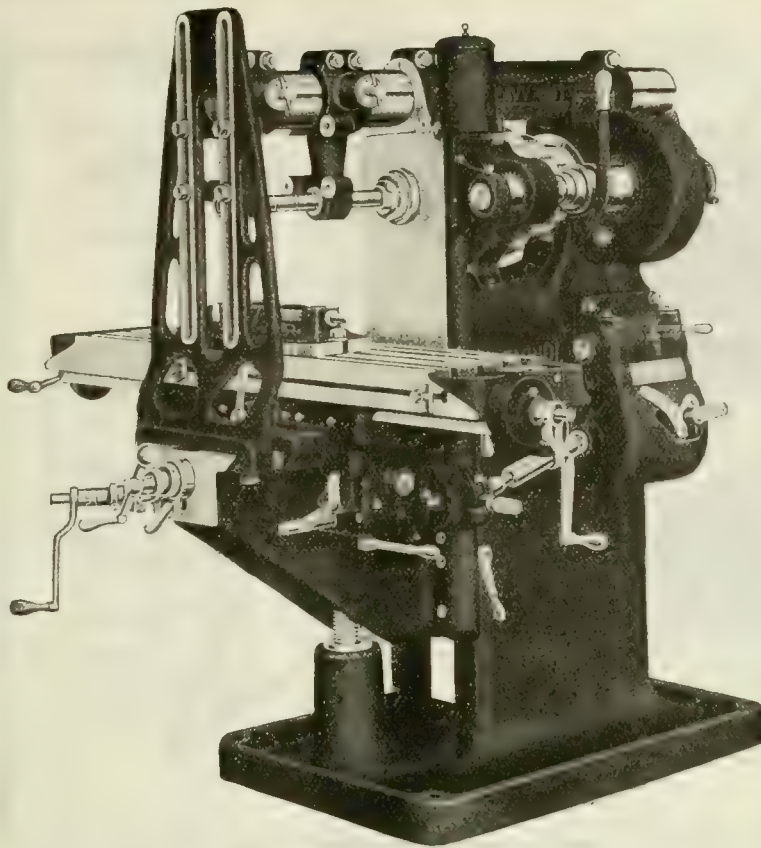
Uranium--This rare element, cousin to Radium, effects a profound change in the texture and quality of the steel.

Added to these, the constant care and skill of years of steel-making experience make the result of each melt a foregone conclusion.

Latrobe Electric Steel Co.

LATROBE, PENN.

URANIUM



LeBLOND Heavy Duty Milling Machines

Plain or Universal Types—Cone or Gear Drive. All commercial sizes No. 0 to No. 5.

Adapted for the Heaviest Manufacturing or the most exacting tool room service. A suitable Range and Capacity for every class of milling.

Patent Self-Aligning Arbor Supports—

Hardened Steel Spindle Bearings—

Double-Friction Back Gears—and the simplest type of right-hand control, contribute to an increased production and longer life as a precision machine.

**The R. K. LeBlond Machine
Tool Company**

CINCINNATI, OHIO, U.S.A.

Canadian Agents:

THE A. R. WILLIAMS MACHINERY CO., LIMITED
St. John, N.B. Montreal, P.Q. Toronto, Ont.
Winnipeg, Man. Vancouver, B.C.



ELECTRIC Steel Castings

High Grade STEEL Castings
Of Every Description

Prompt Deliveries

Send us your drawings
for estimates.

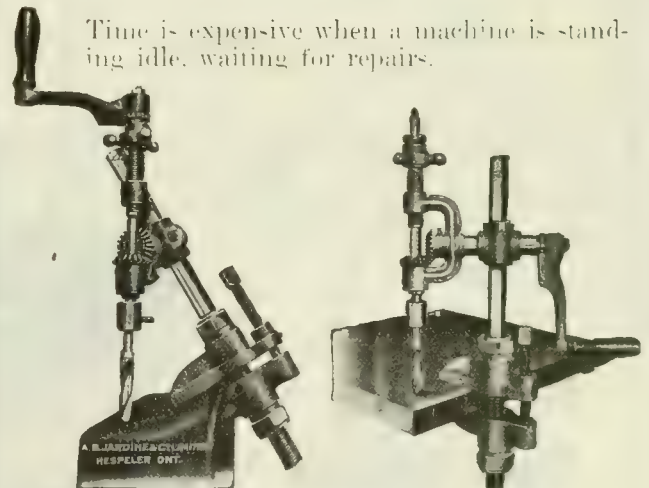
**THE ELECTRIC STEEL AND METALS
COMPANY, LIMITED**

WELLAND

ONTARIO

Jardine Universal Ratchet Drill

Time is expensive when a machine is standing idle, waiting for repairs.

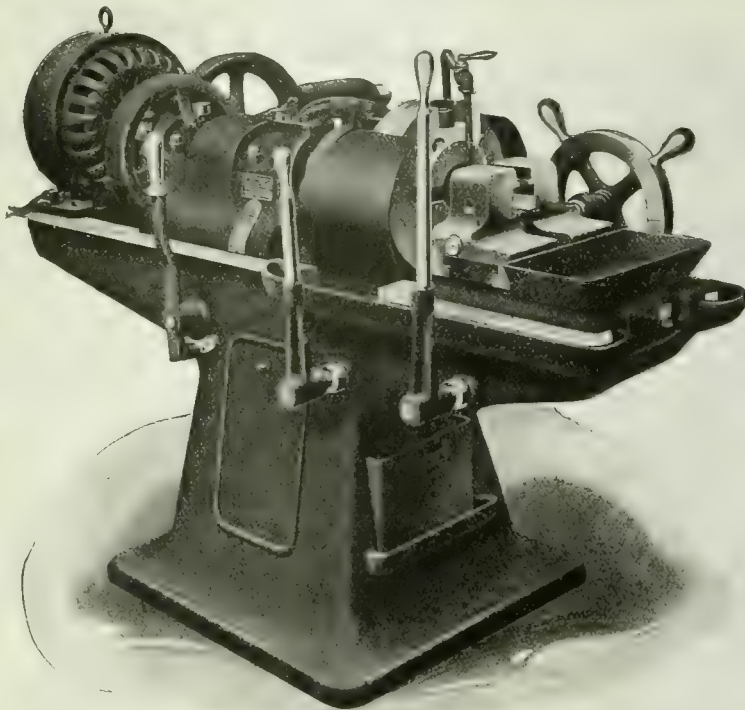


On the average repair job, this machine completes the drilling in less than the time required to set an ordinary ratchet to begin.

Weight, 40 lbs. Price, \$26.50 net

Sold by all Machinery and Supply
Houses

A. B. JARDINE & CO., Limited
HESPELER, ONTARIO



Front View
2 In. Single Head Nipple Machine—Motor Drive

**Our New 2" Single Head
Rapid Nipple and Pipe
Threading Machine
Motor Drive**

*Constant Speed Motor
All Gear Drive - Change
Lever*

*6 Changes of Speed
Large Reservoir
Special Oil Trough
Cutting Box*

*Many Other
Features*

JOHN H. HALL & SONS, LIMITED

MANUFACTURERS OF
Pipe Threading Machinery

*We
Manufacture
All Sizes*

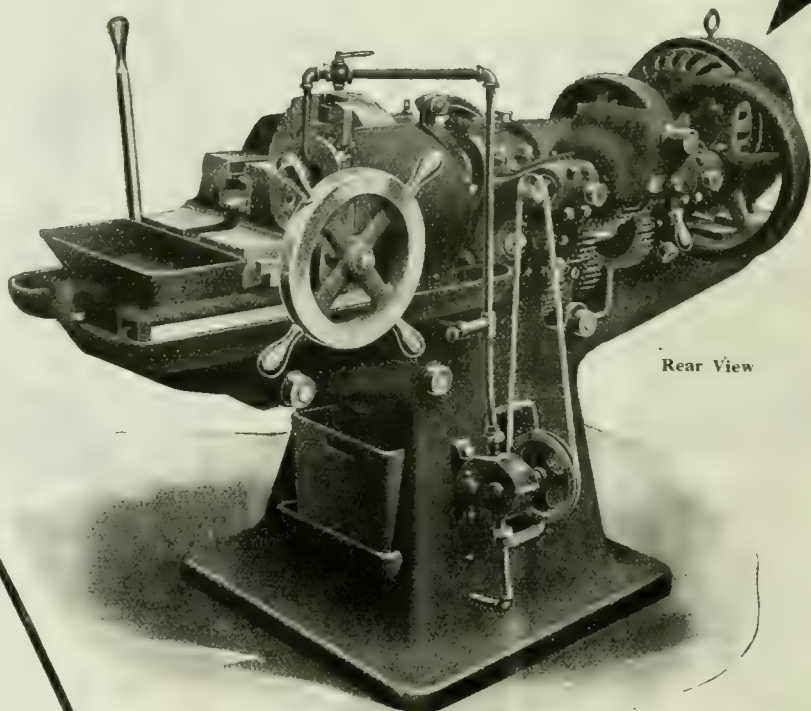
**Roller
Cutters**

Pipe Machines

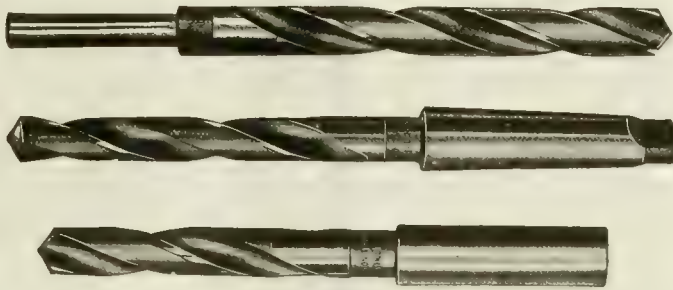
Nipple Machines

Special Machinery

*WRITE FOR NEW
DESCRIPTIVE BULLETINS
JUST ISSUED*



Rear View

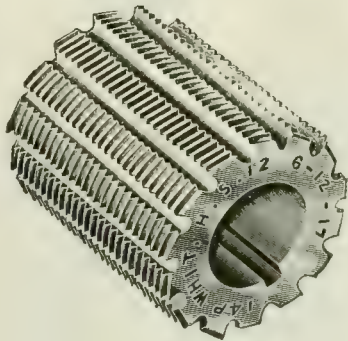


BUTTERFIELD

TWIST DRILLS, GEAR AND MILLING CUTTERS



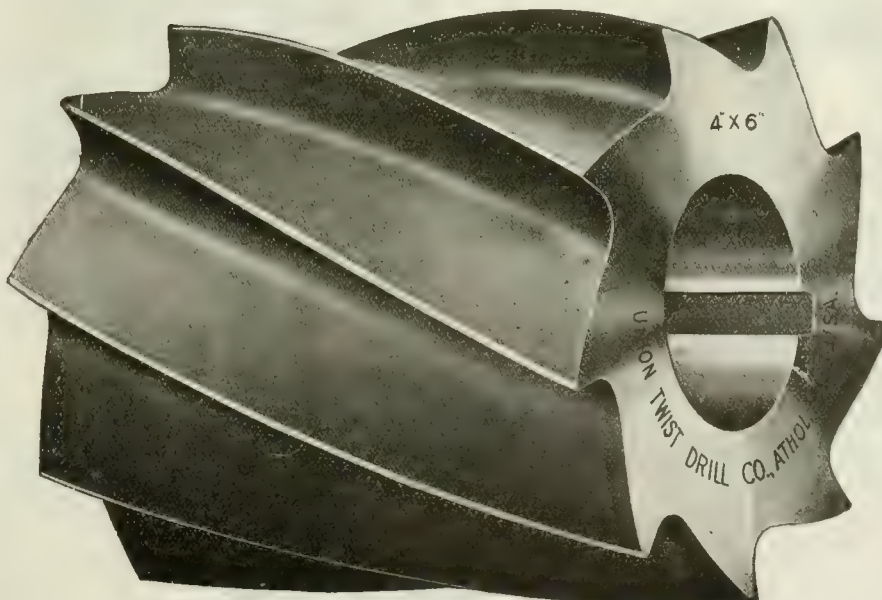
*(Carbon and High
Speed Steel)*



Their ability to serve accurately and long equals that of Butterfield Taps, Dies and Reamers—the sincere praise of a thousand users wouldn't be a better recommendation.

They are the happy result of a great combination of specially trained men and the finest special machinery.

OUR COMPLETE LINE OF DRILLS AND CUTTERS ARE FULLY DESCRIBED IN OUR CATALOG A. Be sure to send for a copy.



**Butterfield & Co.,
Inc., Rock Island, P.Q.**
Toronto Office: 220 King Street West



THERE is as much difference
in the various makes of High
Speed Steel as there is in men—

The practice and methods of manufacturers
differ widely in every mill and anyone who is
at all familiar with the manufacture of High
Speed Steel thoroughly understands this

"Red Cut Superior"

The Nationally Known—First Quality

HIGH SPEED STEEL

is the best for all Machine Work

ARE YOUR TOOLS MADE OF "Red Cut"?

VANADIUM-ALLOYS STEEL COMPANY

Gen'l Sales Offices: Pittsburgh, Pa.

Works: Latrobe, Pa.

BRANCH OFFICES:

TORONTO
MONTREAL
NEW YORK

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CINCINNATI
DETROIT
PITTSBURGH



WOLFRAM

HIGH SPEED STEEL

VULCAN TOOL STEELS

for Every Purpose

Vulcan Special Vanadium—For Punches and Dies. Has wonderful wearing qualities.

Vulcan Non-Shrinkable—For Intricate Dies. Does not warp. Does not shrink.

Vulcan Regal No. 2—For Fine Finishing Tools. The highest grade tungsten finishing steel.

Vulcan Hecla—For work requiring great strength. The first high grade Chrome Vanadium steel produced in America.

WRITE FOR CATALOGUE

Vulcan Crucible Steel Co.

ALIQUIPPA

Established 1900

PA., U. S. A.

Makers of Wolfram High Speed Steel

BRANCHES:

Boston
Chicago
Detroit

102 Purchase Street
16-18 So. Clinton Street
316 New Telegraph Bldg.

Montreal
Newark, N. J.
St. Louis

Herold Bldg.
52 No. 11th Street
1215 International Life Bldg.



“WACO”



High Speed Steel

“Double Waco” Quality—for
Quick Production Work

“Turtle Brand”—High-class
Tool Steels, Files, Drills, etc.

MANUFACTURED BY

WM. ATKINS & COMPANY, LIMITED

RELiance STEEL WORKS

Established 1870

SHEFFIELD, ENGLAND

*Sole Representatives
for Canada*

GEO. A. MARSHALL & CO.

1118 Queen Street West, Toronto, Ontario

*Phone Park.
250*



Uranium High Speed Steel has the physical qualities required of the most effective machine shop tool.

A Uranium High Speed Tool will take deeper cuts at a higher speed and keep its edge longer.

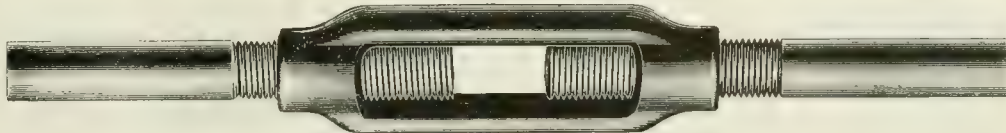
It, therefore, will directly increase the productive capacity of every machine in your shop.

STANDARD ALLOYS COMPANY

Forbes and Meyran Aves. PITTSBURGH, PENNA.

CANADA FOUNDRIES & FORGINGS LIMITED

DROP FORGED STEEL

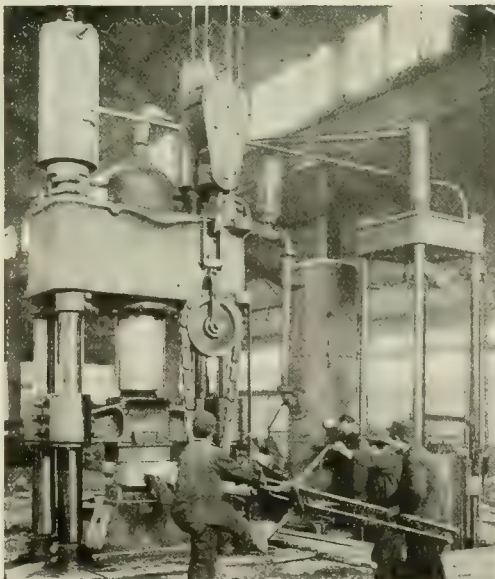


TURNBUCKLES

16 Sizes, with or without Stubs
Large Stock---Quick Action

Produced at

Canadian Billing & Spencer Plant
Welland



1200-ton Hydraulic Press working steel crank shaft forgings.

Rings by the Thousand

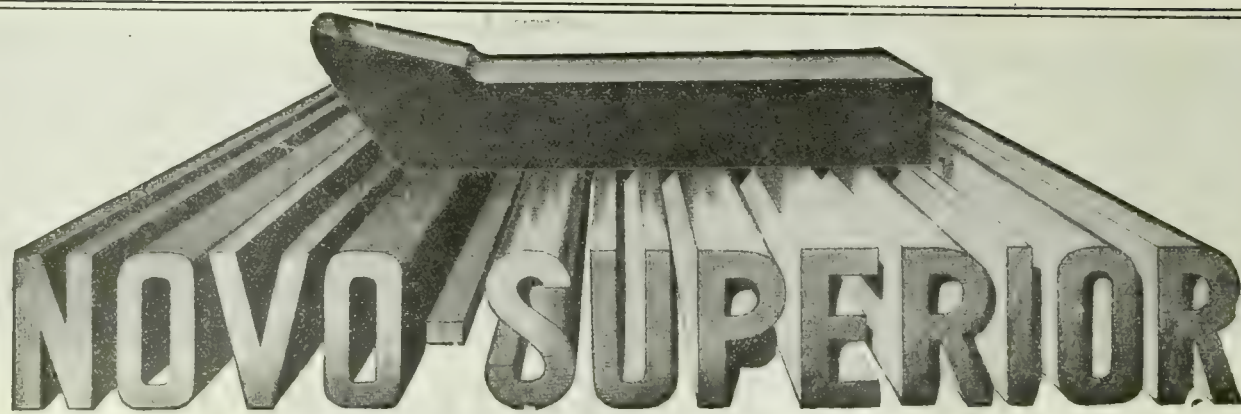
While we are specialists in all kinds of hammered and pressed forgings, the magnitude of the call for HAMMOND WELDLESS RINGS establishes the fact that they have become the Standard in this line of work.

For Ball and Roller Races

try HAMMOND SPECIAL BEARING STEEL made into WELDLESS RINGS. These will go to you forged close to size and true in shape. They will be annealed under perfect conditions and expert care to a Brinnell test which puts them in just the right state for machining.

Send us a trial order and let us prove that for GOODNESS OF MATERIAL and ECONOMY OF LABOR our combination is hard to beat.

Hammond Steel Company, Inc. ∴ Syracuse. N.Y.



NOVO-SUPERIOR

HIGH SPEED STEEL

INTRA STEEL

GIBRALTAR STEEL

Tool Steel for Every Purpose

Twist Drills, Taps, Hack Saw Blades, Milling Cutters, Files, Etc.,
Music Wire for Springs, Steel Balls.
Cold Rolled Mild Steel for Shafting, Etc.

We call to your particular attention that we make a specialty of
and solicit your inquiries for

Circular Saws—for wood and for hot or cold metal cutting

Machine Knives—for cutting wood, paper, tobacco, agricultural.

H. BOKER & CO., INC., 332 St. James St., Montreal, P.Q.

IMPERIAL GENUINE BABBITT METAL *The Highest Grade Manufactured*



Made specially for all HIGH SPEED, HEAVY ENGINES and EXTRAORDINARY HARD WORK

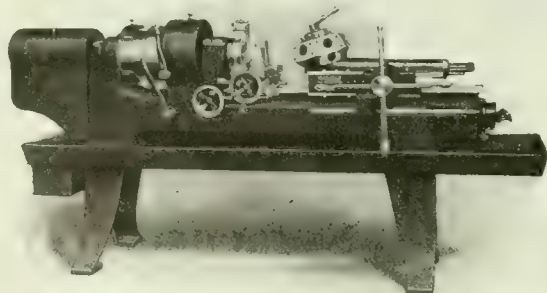
Manufactured and guaranteed to give excellent service by

THE CANADA METAL COMPANY, Limited, FRASER AVENUE TORONTO, Hamilton, Montreal, Winnipeg, Vancouver



THE TILTED TURRET

A CLEAR TRACK FOR THE STOCK

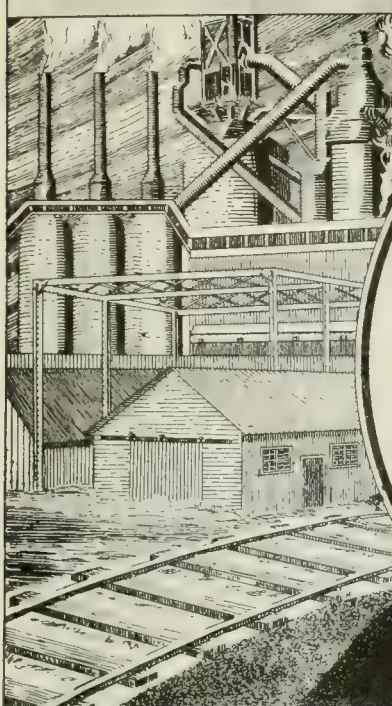


INVESTIGATE!

SEND FOR
CATALOG "C"
OR
ASK THE USER

WOOD TURRET MACHINE CO.

BRAZIL INDIANA U.S.A.




SaBen Extra

HIGH SPEED STEEL

The Highest Achievement of British Tool Steel Metallurgy.

H.A. DRURY COMPANY LIMITED

MONTREAL TORONTO NEW YORK



Crucible AND Open Hearth Steel Tool Steel

“ARGO” BRAND HIGH-SPEED STEEL

The John Illingworth Steel Co.
1856

Frankford, Phila.
New York Office 217 Broadway

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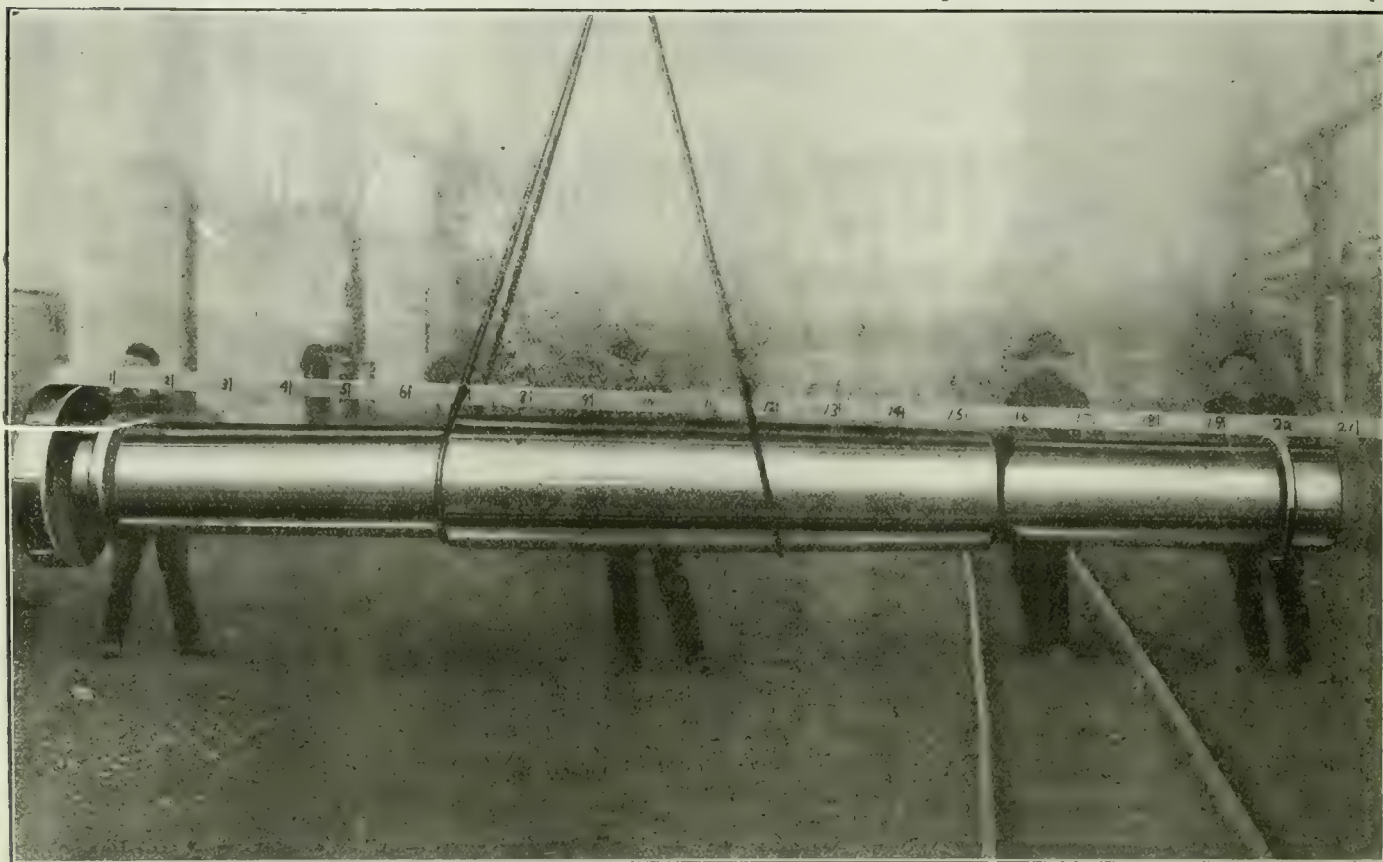
We ship GEARS to all parts of Canada

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Get our Gear Catalog: **“ALL ABOUT GEARS.”**

Nova Scotia Steel & Coal Company *Limited*

New Glasgow, Nova Scotia, Canada

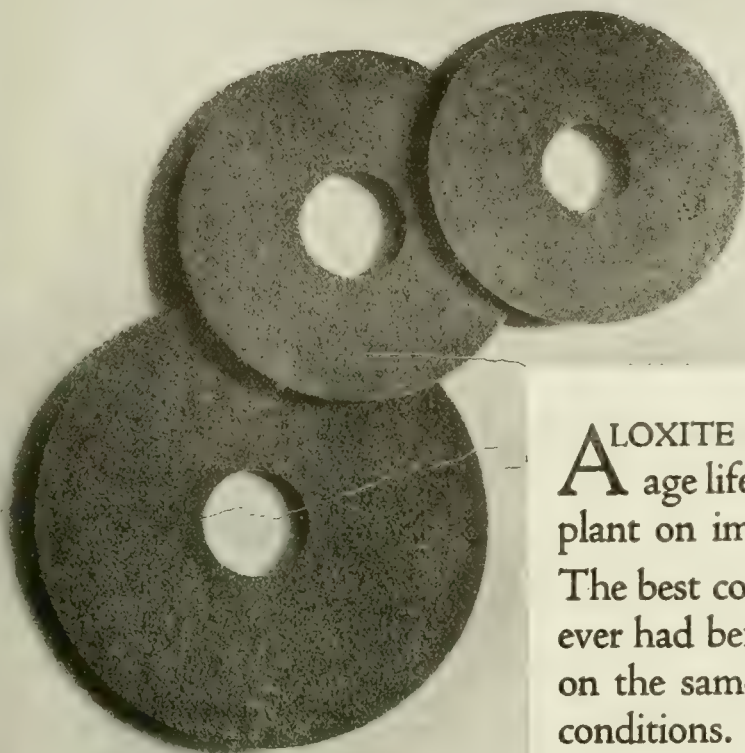


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Heavy Marine Engine Forgings in the Rough or Finish Machined

Our Steel Plant at Sydney Mines, N.S., together with our Steam Hydraulic Forge Shop and modernly equipped Machine Shop at New Glasgow, N.S., place us in position to supply promptly Marine Engine Crank and Propeller Shafting, Piston and Connecting Rods; also Marine and Stationary Steam Turbine Shafting of all diameters and lengths, either as forgings or complete ready for installation, and equal to the best on the American Continent.

Adding 23 Hours to the Life of a Disc



ALOXITE AND CARBORUNDUM DISCS

In all grits and sizes;
in four weights for all
classes of work

ALOXITE Discs showed an average life of 45 hours in a Buffalo plant on important war work.

The best competitive discs they had ever had before lasted but 22 hours on the same work, under the same conditions.

This is a record that should interest you in getting Aloxite and Carborundum Discs in your plant.

It's because of the way we make our discs; grading them to suit your particular work. They are discs that are uniformly coated, sharp, clean and fast cutting.

And they wear right down to the fabric without glazing. They are
The Discs That Do

THE CARBORUNDUM COMPANY

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"Not Steel but its Master"

The Progressive Mfg. Co., Limited
CANADA

Gentlemen:—

We beg to advise that in spite of the rise in price of imported High Speed Milling Cutters, you can still secure a Canadian product at pre-war prices.

During the War, although our capacity was taxed to the limit in supplying STELLITE to Great Britain and France, as well as helping to keep Canada in the forefront as a producer of munitions, we did not raise our prices, notwithstanding the fact that our costs increased enormously and are still up.

Let us help you to economize and at the same time secure maximum results.

Consult our Engineering Department.

We are, Sirs,

Yours respectfully,

Deloro Smelting & Refining Company, Limited

TORONTO
200 King Street West

H.O. and WORKS: DELORO, ONT.

MONTREAL
315 Craig Street West

Grinding 85 Holes an Hour at the Timken-Detroit Axle Co.



Heald Grinders always travel right on the heels of the operator, for speed in grinding, as is well known, is largely a matter of chucking.

Here is a case in point that proves that Heald Internal Grinding Machines, in addition to their dependability, meet all speed requirements. The illustration shows a Heald No. 75 Internal Grinding Machine at the plant of the Timken-Detroit Axle Co., Detroit, Mich. It is grinding holes in small differential pinions at the rate of 85 an hour, or one every 42 seconds.

One feature of Heald Internal Grinders that greatly contributes to speed is the Automatic Wheel Guard which prevents accidents. The operator's attention is not distracted from his work by fear of getting hurt. While grinding, the guard stands to the rear but automatically swings forward to cover the wheel as it moves out from the hole.

The Timken-Detroit Axle Co. has 20 Heald Machines in service.

Play safe when you need internal grinding machines. Go to the largest builder in the world specializing in them—the Heald Machine Co. Our nearest Branch Office can give you regular home office service.

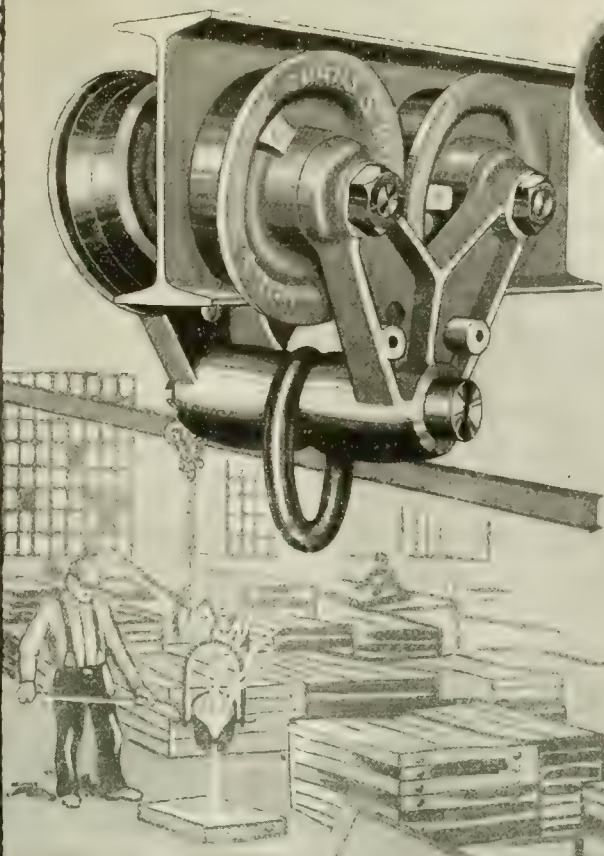
The Heald Machine Company

Worcester, Mass.

New York, 839 Singer Bldg. Philadelphia, 1308 Commonwealth Bldg. Chicago, 24 South Jefferson St. Detroit, 911 Majestic Bldg. Cincinnati, 311 Provident Bank Bldg. Cleveland, 721 Engineers Bldg. Western Agents: Eccles & Smith Co., San Francisco, Los Angeles and Portland. Salt Lake Hardware Co., Utah and Idaho. Foreign Agents: Alfred Herbert, Ltd., England. Societe Anonyme, Alfred Herbert, France and Switzerland. Societa Anonima Italiana, Alfred Herbert, Italy. F. W. Horne Co., Japan. Wilh. Sonesson & Co. Sweden, Denmark and Norway. American Machinery Syndicate, Spain and Portugal.

"Dependability First"





CURTIS TROLLEYS

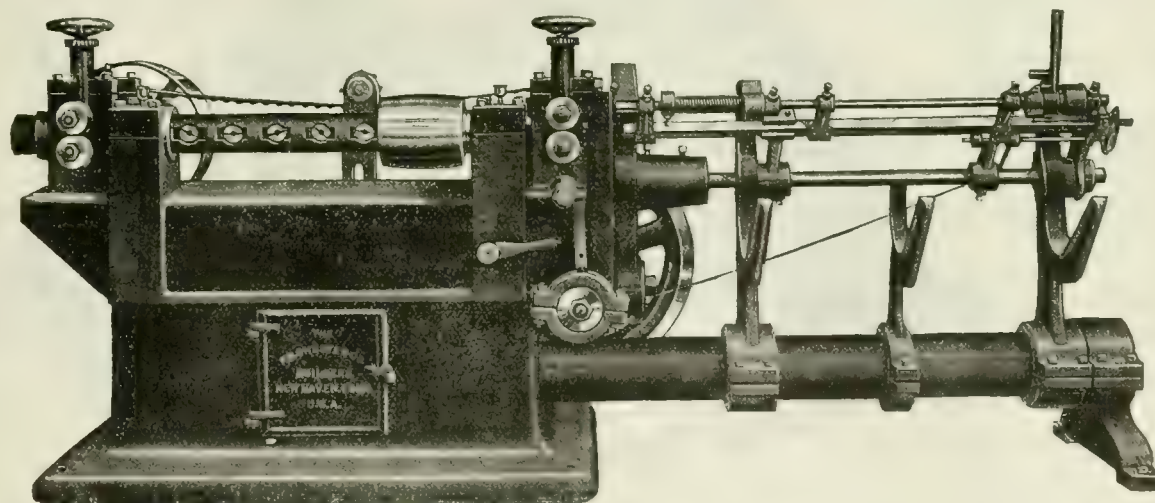
Increase Production--Save Man-Power

CURTIS Single 1-Beam Trolleys are being used by progressive firms demanding the highest operative efficiency. A Curtis Hyatt Roller-Bearing Trolley with a 4000-lb. load can be moved by a 50-lb. pull, while ordinary trolleys require nearly twice as much power to move the same weight.

Curtis Trolleys are constructed with large inclined wheels and self-equalizing steel side-frames—so that each wheel always bears its rightful proportion of the load. They are equipped with shock-absorbing Hyatt flexible Roller Bearings—which make the trolleys easy-starting, easy-rolling and long-lasting. Full information and descriptive literature on request.

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Perfect Wire Straightening Quickly and Profitably Done on Our Automatic Wire Straightening and Cutting Machine

Just put your coil of wire on the reel, adjust the rolls and dies, and set the gauge for the length you want. The machine does the rest—thousands of feet per day, perfectly straight and cut to accurate lengths.

Catalogue tells more about them, and we'll be glad to send you a copy.

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FORMERLY JOHN ADT & SON

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Here it is, Mr. Manager

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Every size in Roughing and Finishing reamers from 1" to 5 $\frac{3}{8}$ " diameter in Fractional or Metric sizes. No matter how odd the size, it's there. No delay, no holdup in production, always Ready for Service. They Adjust. Indispensable to your tool room, Turret Lathe or Screw Machine Department. No machine shop should be without this set.

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Burton, Griffiths & Co., Ltd., London, English Agents

40 Domestic Agencies

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The "RACINE"



For Speed
For Accuracy
For Quantity
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For Saving in
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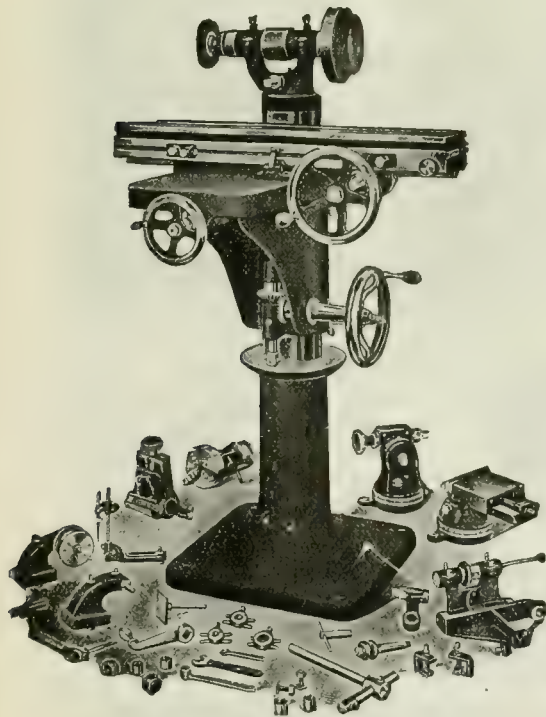
Advise us the size stock you intend cutting and we will quote you on a machine suited to your requirements.

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The *Greenfield* Universal Grinder

For General Tool Room Work



This Grinder is furnished with attachments for grinding all sorts of milling cutters, reamers, counterbores, and other machine shop tools.

It is also suitable for cylindrical, internal and flat work which frequently turns up in the making of tools and jigs.

These attachments are all very simple in design and easily adjusted upon the machine, being graduated so that any desired angles can be at once obtained.

The whole machine is thoroughly well built, well finished, and will be found a dependable, convenient grinder.

Greenfield Machine Company,
GREENFIELD, MASS., U.S.A.

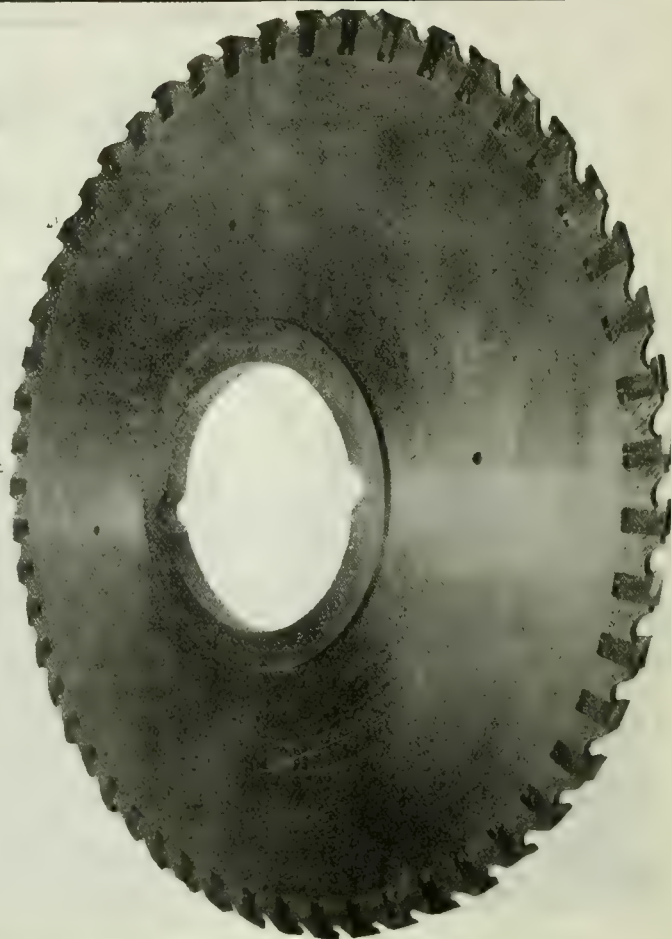
90-inches in diameter

Cut on right shows a Hunter Duplex Inserted Tooth Saw used by the Erie Forge Co. for cutting gun forgings. It is the largest inserted tooth saw blade we know of ever having been made in the United States or any other country—1" plate, 1 5/16" kerf, and contains 56 high-speed steel teeth, and weighs approximately 3,000 lbs.

Hunter Duplex Saws

No matter what your sawing requirements may be, there is a Hunter "Duplex" Saw that is just right for the work. The discs are made of Chrome-Vanadium Steel, oil treated.

Hot Saws, Friction Discs, Solid Blades made of Vanadium, Tungsten and Chrome Alloy Steels. Saw Sharpening Machines. Inserted Tooth Grinders. Hardened Steel Specialties. Write for prices.



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HACK SAW BLADES
UNEQUALED IN QUALITY ANY SIZE OR LENGTH
Simonds Canada Saw Co. Limited
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HEAVY MACHINE SAW BLADE
ENOX
12 TEETH
TYPE & SPEED OF MACHINE

ENOX Hacksaw Blades

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LIGHT MACHINE BLADE
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**Endurance
means long life
--hence economy**

If you want a hack saw to endure—use one made for your particular cutting requirement.

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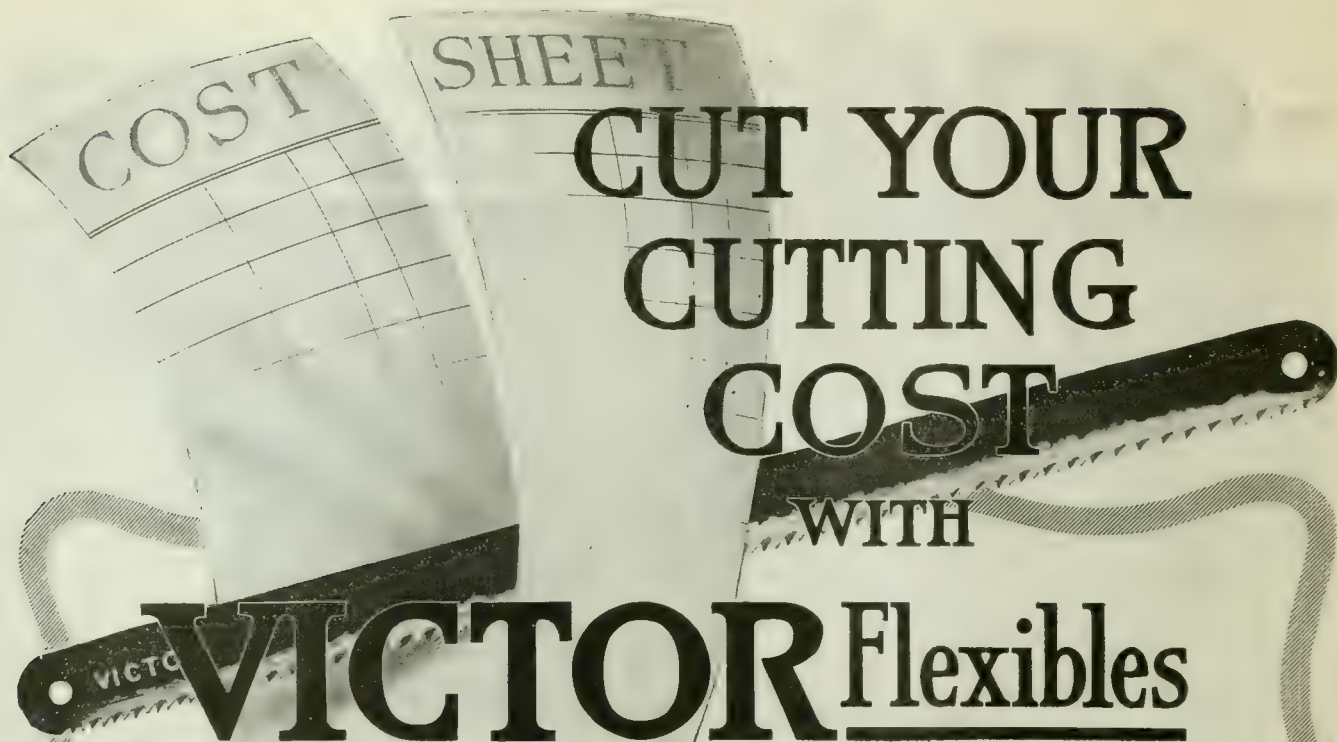
are made to endure—to last long and are truly economical because there is a saw for any job.

Our Hack Saw Chart

will tell quickly which is the proper saw to use for every metal. Keep it before you. Write to-day also asking for Catalog No. 21-3 on Starrett fine precision tools.

The L. S. Starrett Company
The World's Greatest Tool Makers
 Manufacturers of Hack Saws Unexcelled
 Athol, Mass.

42-597



CUT YOUR CUTTING COST WITH **VICTOR** Flexibles

The high cost of tools should emphasize more than ever the importance of quality.

The high cost of hack saw blades ought to drive every hand blade user over to the saw that does not break in ordinary hand work.

VICTOR FLEXIBLE HACK SAW BLADES have exactly the same cutting power as the finest All-Hard on the market, and that they cannot be broken in use except by intentional abuse is an undisputable fact—which will represent a saving from twenty-five percent to thirty-three and one-third percent in breakage alone.

Seventy-five percent of the All-Hard blades used in hand frames break before they are worn out. Watch the All-Hard blades in your own shop and see the enormous amount of breakage—then use VICTOR FLEXIBLES and note the economy.

VICTOR SAW WORKS LTD - HAMILTON, CANADA

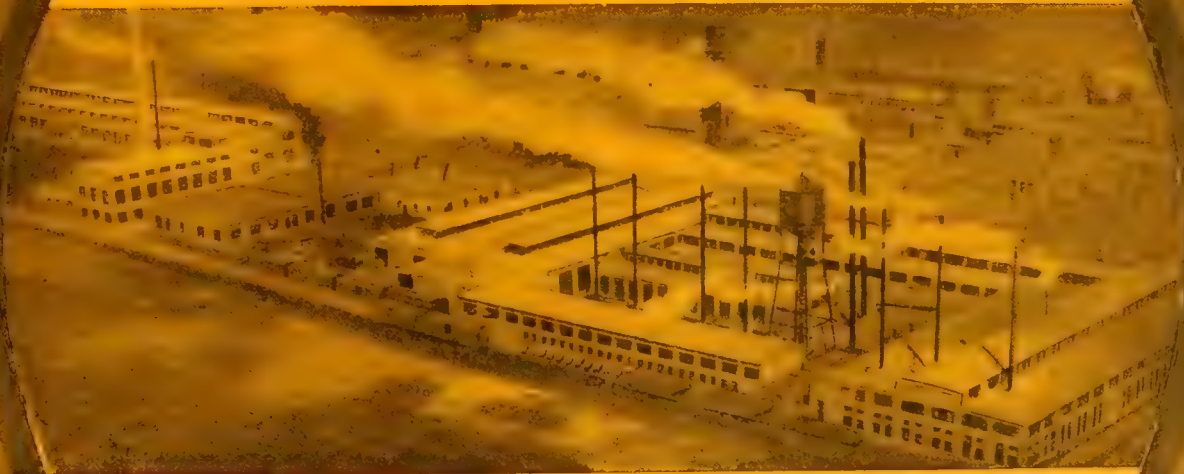




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Beaver Brand Metals

Copper, Brass, Bronze, Canada Silver, and Gilding Metal in sheets, rolls, plates and rods. Naval Bronze, Yellow Metal and Muntz Metal in sheets and rods for shipbuilding requirements. Specify Beaver Brass Rod for drilling and free cutting. Extruded shapes.



Seamless Brass and Copper Tubes.
Guaranteed Ingot Metals—Yellow, Red and Composition Ingots.
We are Purchasers of Copper Bearing Material.
Link up with Beaver Brand Products—you'll like the quality, price and service.

Brown's Copper & Brass Rolling Mills, Limited

New Toronto, Ont., Can.





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**Malleable and Cast Iron
PIPE FITTINGS**

Both Screwed or Flanged,
Black or Galvanized—All Sizes



**MALLEABLE AND
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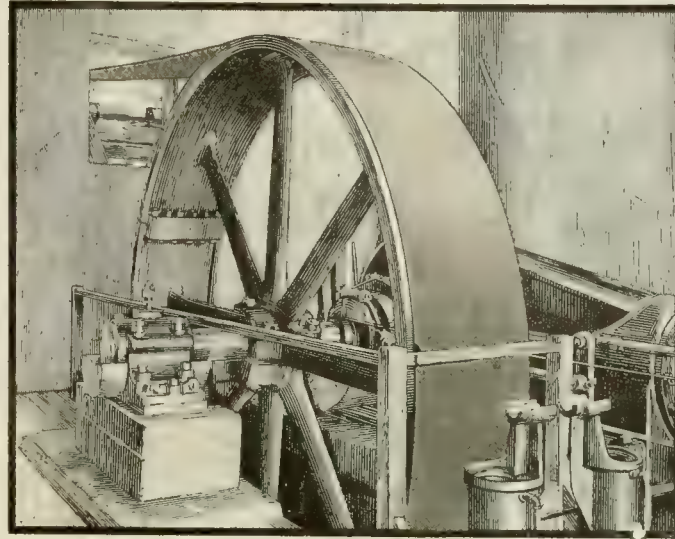
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We have the facilities for filling your orders
with exceptional promptness. Annual
capacity 6,000 tons.

Prompt
Service

International Malleable Iron Co., Limited
Guelph, Ontario



Nature's Contribution to Power

30-inch Neptune Double Belt, 91 feet long, driving mill of J. C. Halsema Mfg. Co., Jacksonville, Fla. This belt has been in operation five and one-half years, and is in as good condition as when first installed. It has given satisfactory service at an overhead charge of \$2.17 per week, or a cost of five mills per horsepower per week

It's the right material in the right place. Nature provided that material, worn originally on the back of a steer. A steer hide is *naturally* tough, strong, pliable, elastic. All of those characteristic virtues are retained to the right degree in Graton & Knight Standardized Tanning. That tanning is done to meet fixed requirements.

Leather stands hard usage. It has a bull-dog frictional grip. It keeps on taking the punishment of main drives and the side-slapping of shifters—and then comes back for *more*. Good belting must have tractable pliability. It must be firm. It must stretch and come back when required. It must be easy to slice and repair. Nothing beats leather for these characteristics. No belting beats Graton & Knight Standardized Series Leather Belts.

Every Graton & Knight Brand isn't recommended for every drive. The work to be done determines the belt to be used—that is the G. & K. Standardization idea. Power transmission requirements are confined to a few classes. There's a standardized belt for every class. The Neptune Double referred to above is one of them. It's the Standardized Belt for use wherever dampness or water is present or where belting is subjected to exposure and rain, snow and other unfavorable climatic conditions; and for excessive loads.

Many of the best belted plants ask us to specify the belting for every *pulley drive*. Try the plan yourself. Then, when buying, call for "Graton & Knight—Brand or equal." This won't commit you to buying our belts. It will put your buying on the one basic consideration—the work to be done.

Write for information about Standardization as applied to Belting.

THE GRATON & KNIGHT MFG. COMPANY, WORCESTER, MASSACHUSETTS, U.S.A.

Oak Leaf Tanners, Makers of Leather Belting, Lace Leather, Leather Packings, and Specialties.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES.

Canadian Graton & Knight, Ltd., Montreal. Canadian Representatives: The Canadian Fairbanks-Morse Co., Ltd., St. John. Montreal. Ottawa, Toronto. Hamilton, Quebec, Calgary, Saskatoon, Vancouver, Windsor, Winnipeg, Victoria.

Tanned by us for belting use.

GRATON & KNIGHT Standardized **Series** **LEATHER BELTING**

Do you know that we have a thoroughly organized engineering department devoted to the interests of all belt users? We have—and it is one of the best in equipment and resources, in the country. You are invited to send us your problems for solution. The only fee involved is your good will.

WALCOTT

The Lathe for Continuous Duty

Hundreds of Canadian shops were working night and day to keep up with the demands of war. This continuous service put a heavy strain upon the machines used. These machines were of quality construction and modern design that stood the strain and gave economical and efficient service. Such is the WALCOTT LATHE. Here is a tool not just built for war purposes; it is a tool that will give you the best of service in peace time as well as war time. And in the WALCOTT you see a lathe with a price as low as possible, compatible with the cost of production.

WALCOTT LATHES are in demand, but our increased facilities put us in a position to supply all Canadian requirements.

WALCOTT LATHE COMPANY

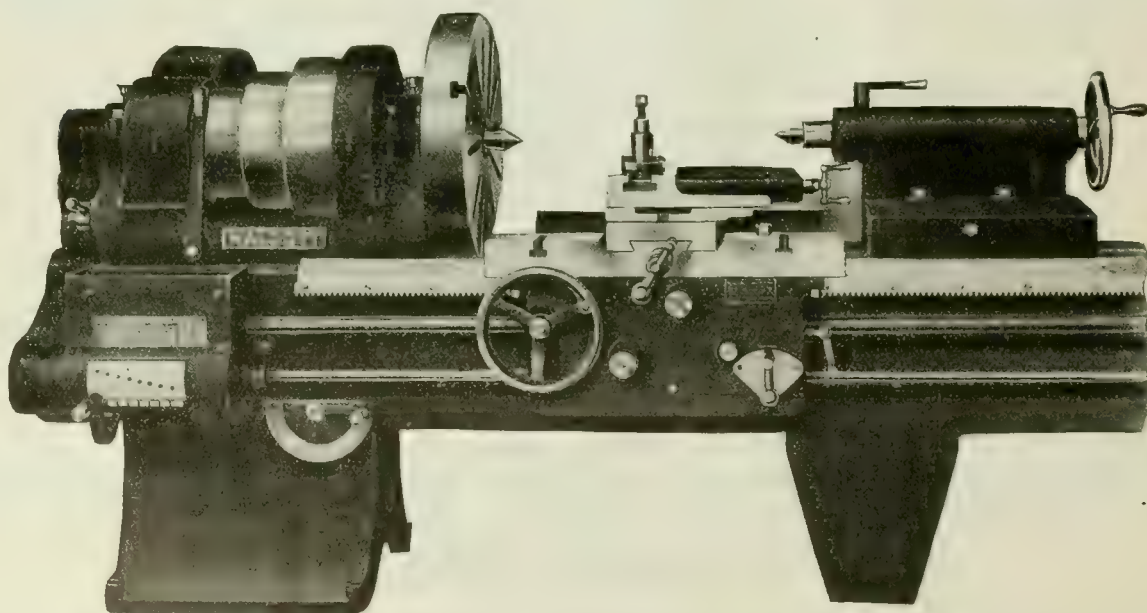
Engine Lathes

140 Calhoun Street

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JACKSON, MICHIGAN

AGENTS:—Hill, Clarke & Co., Chicago, Ill. Frevert Machinery Co., New York City, N.Y. W. E. Shipley Machy. Co., Philadelphia, Pa. National Supply Co., Toledo, Ohio. Motch & Merryweather Machinery Co., Pittsburgh. H. A. Smith Machinery Co., Syracuse, N.Y. Wm. E. Duff, York, Pa. Wm. E. Duff, Jacksonville, Fla. Brown-McDonald Machy. Co., St. Louis, Mo. Smith-Booth-Usher Co., Los Angeles, Calif. Hendrie-Bolthoff Mfg. & Sup. Co., Denver, Col. Gordon & Finkbeiner, Portland, Ore. Northern Machinery Co., Minneapolis, Minn. Brownell Machinery Co., Providence, R.I. Chas. A. Strelinger Co., Detroit, Mich. Marshall & Huschart Machinery Co., Indianapolis, Ind. Fenwick, Freres & Co., Paris, France. Buck & Hickman, Ltd., London, England. Parke & Lacey Co., Sydney, N.S.W. Standard Machy. & Supplies, Ltd., Montreal, Que. Canadian Fairbanks-Morse Co., Ltd., Toronto, Ont.



More Lumber Mill Testimony

"Extra Power" in Splendid Shape After Three Years of Use

IN practically every line of industrial endeavor belt buyers are learning the merit of Extra Power Belting by testing it on the hard and troublesome drives.

Now comes a verdict from the far West. Mr. S. Thorpe, of the Forrest Mills of British Columbia, tested an Extra Power Belt on a difficult drive

This belt runs on the edger engine—under conditions as severe as can be found anywhere. The load is jerky and heavy. The belt speed is high—6,050 feet per minute. A heavy tightener, set close to the drive pulley holds the belt down. An idler pulley also holds the belt down on the driven pulley.

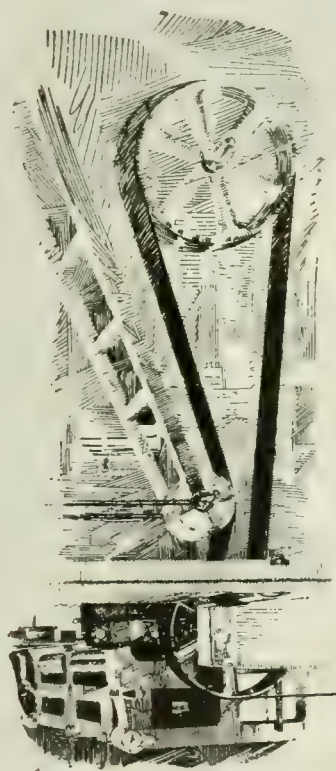
"Your Extra Power Belt," he says, "which is 10-inch, 7-ply, has run on the edger for three years and has not given one minute's trouble, and at the present time doesn't look ten per cent. worse than when it was put on."

In selecting belting for your plant, remember that it does not pay to be skeptical. Get in touch with the nearest Goodyear belting man. Let him relate to you how the steam and water in pulp and paper mills; the slow, heavy pulls and the shifting pulleys in shell factories and machine shops; the high speed machines and heavy tighteners in lumber mills; the multiple pulley drives in textile mills; the exposed work of quarries, mines, cement plants and brick plants—all have been belted economically and well by Goodyear Extra Power.

The Goodyear Tire & Rubber Company OF CANADA, LIMITED

Branches: HALIFAX, ST. JOHN, MONTREAL, OTTAWA, TORONTO,
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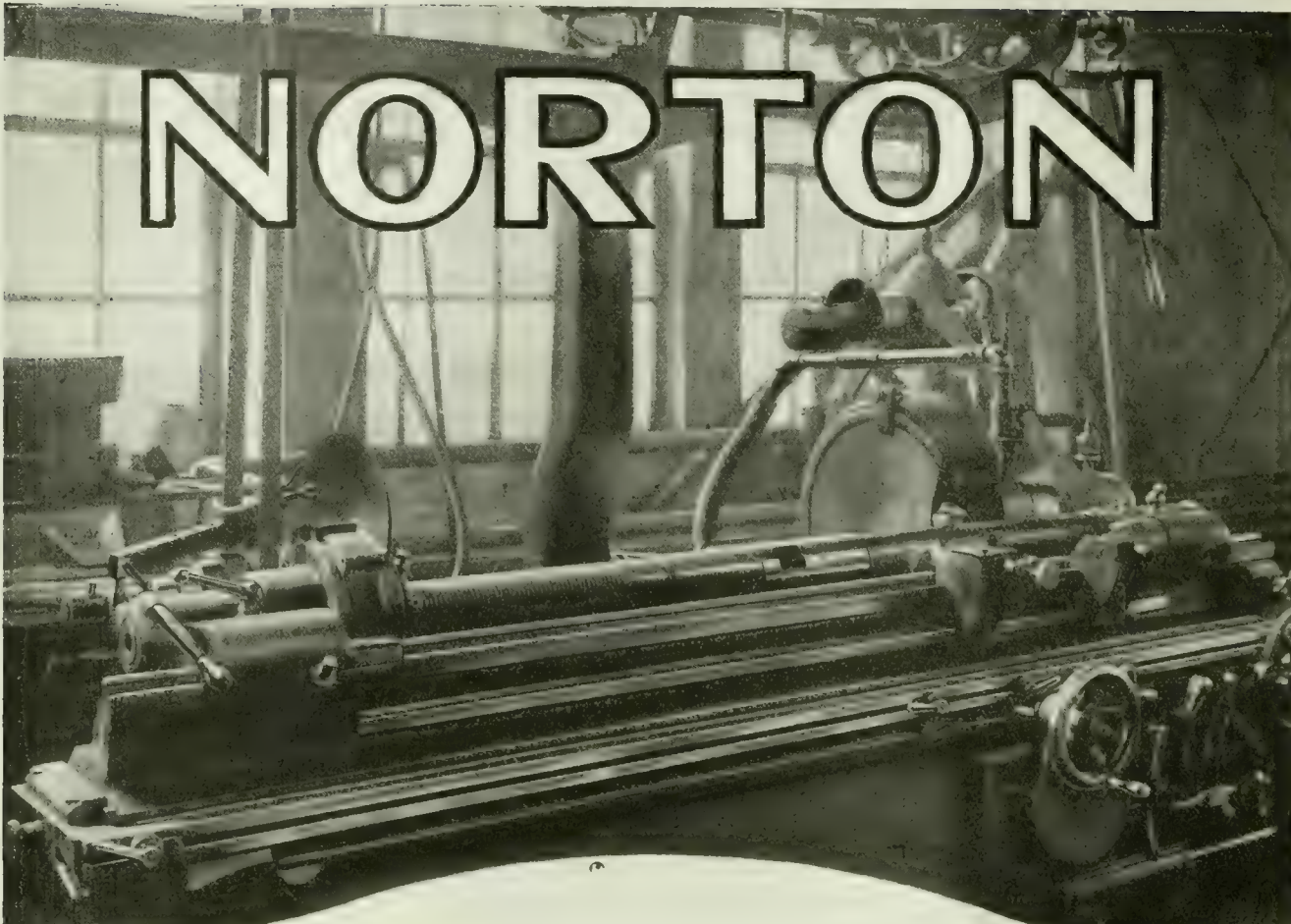
Service Stocks in Smaller Cities.



GOODYEAR
MADE IN CANADA

EXTRA POWER BELTING

NORTON



In these days of gigantic demand Nortons everywhere keep production up

Here's a grinding job up in Vermont at the Jones & Lamson plant. It's a Drum Drive Shaft for a J & L Turret Machine. The material is machine steel and its rough size is 1 9/32 in. x 1 17/32 in. x 1 25/32 in. x 1 13/32 in. The finished size is 1 1/4 in. x 1 1/2 in. x 1 3/4 in. x 1 3/8 in.

A limit is set of .0005 in.—and maintained at the rate of 28 complete shafts per day.

Isn't an installation—in a plant so thoroughly well known in the quality field as Jones & Lamson—an endorsement for Nortons that you can't afford to overlook when you are ready for grinding machines?

Norton Grinding Company, Worcester, Mass.

Chicago Store: 11 North Jefferson Street

Canadian Agents:

The Canadian Fairbanks-Morse Company, Limited

St. John	Quebec	Montreal	Ottawa	Toronto	Hamilton
Windsor	Winnipeg	Saskatoon	Calgary	Vancouver	Victoria

This Tool

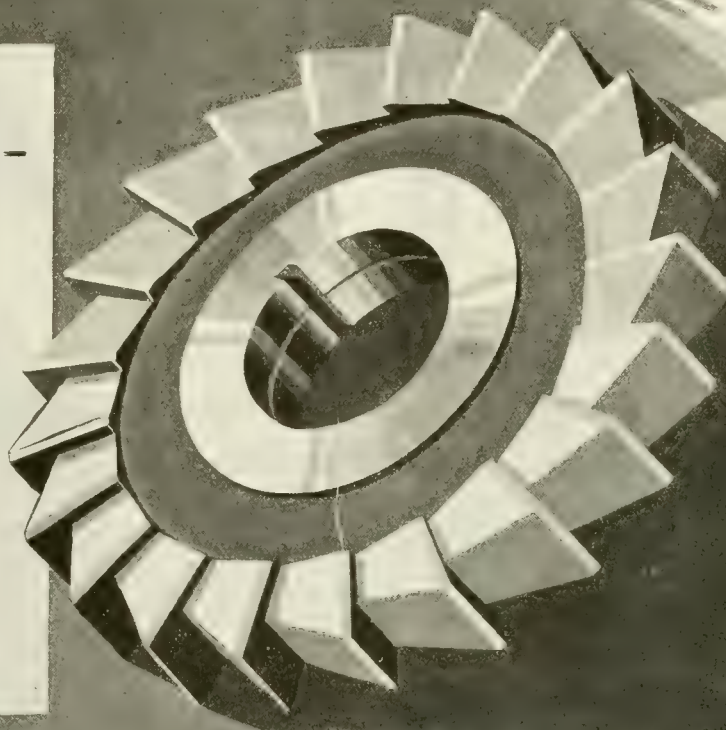
*was tested in a well-known
plant in New York*

It is a Davidsonized milling cutter, 4" diameter by $\frac{1}{2}$ " face. Run at a speed of 250 R.P.M., and with a feed of $\frac{7}{8}$ " per minute, taking a cut $\frac{1}{2}$ " wide by $\frac{1}{2}$ " deep, it worked without any difficulty for ONE HOUR AND THIRTY-TWO MINUTES.

As against this, a high-speed steel milling cutter of one of the best-known makes, and also a cutter made from one of the best-known high-speed steels, ran under the same conditions for TWENTY-EIGHT MINUTES. At the completion of the test the Davidsonized cutter was in better condition than either of the other two tools.

The material tested was .45% Carbon Open Hearth Steel, containing .70% Manganese.

*Name on request.



You Can't Get Away From Facts Like These

We claim that it is possible in a majority of instances to obtain similar results.

Davidsonized High Speed Steel

offers you great opportunities for increased production, long service and tool-making economy. We guarantee any tool of Davidsonized High Speed Steel to give you at least 10% better service than any other tool you have been using on corresponding work. You will be the sole judge. More and more of the leading machine shops are turning to this steel of remarkable service, because—

- (1) It increases production 10% or more. Such an increase, figuring factory overhead and labor, multiplies several times over the value of the tool.
- (2) The guarantee above gives absolute protection.
- (3) Davidson Special Service cuts tool-making time and tool-room costs.

SPECIAL SERVICE

We will supply Davidsonized Tools, semi-finished and easier to machine than any carbon tool steel, within approximately 1/64 of finish on face, 1/64 in bore and 1/32 in diameter, leaving only the final hardening and sharpening to be done in your tool room. A tool that takes 20 hours to make from the solid bar can easily be finished from a Davidsonized blank in about two hours. And we will guarantee our tools against breakage in hardening.

This service, though it applies also to standard tools is especially desirable in the case of tools made to unusual shapes and other specifications.

Use this special service. It costs you less than to bring your tools from the bar to the stage at which we furnish them. It eliminates the loss of breakage in hardening. And, most important of all, it gives you better tools than you have been using, tools capable of such performances as the one described above, tools that will boost your production and give you longer service. Send us a trial order; our guarantee prevents all risks. Correspondence invited.

THE DAVIDSON TOOL MFG. CORPORATION

Head Offices: 118-122 Maiden Lane, N.Y., Works: 56-62 North St., Brooklyn, N.Y.

THE CANADIAN FAIRBANKS-MORSE CO., LIMITED

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Rigidity Plus

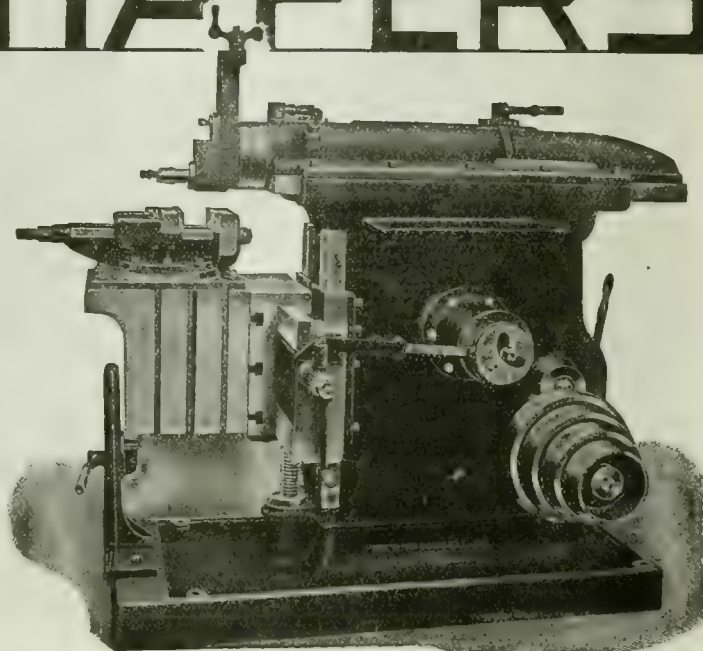
Simple Design and
Convenience of Adjustments

*give operator every facility for ease of
operation and Accuracy in Production*

Our circulars, containing complete
specifications and descriptions, are
ready. Write us for one.

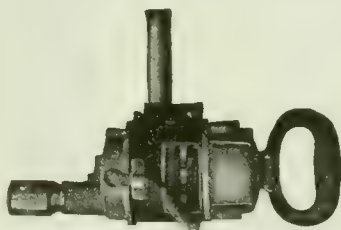
The R. McDougall Co., Limited
GALT, ONTARIO

THE CANADIAN FAIRBANKS-MORSE CO., LIMITED
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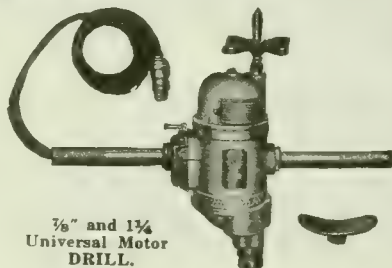


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3-16 in., W.G.T., 6 lbs.
1/4 in., W.G.T. 9 lbs
5/16 in., W.G.T. 12 lbs.

All motors wound for
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Direct or alternating
current.

Try a few of our
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Grinders and you'll
send us an order for
more. Our guaran-
tee protects you.



5/8" and 1 1/4"
Universal Motor
DRILL.

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They can be at-
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socket.

For drilling in
metal they are su-
perior to any other
kind of portable
drill. Cost 50% less
to run than air
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Because they are processed entirely by the
most expert workmen in this highly spe-
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Because they are made in Canada by Cana-
dian Capital and Canadian Labor.

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"They Cut Faster and Wear Longer."

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Sole Selling Agents

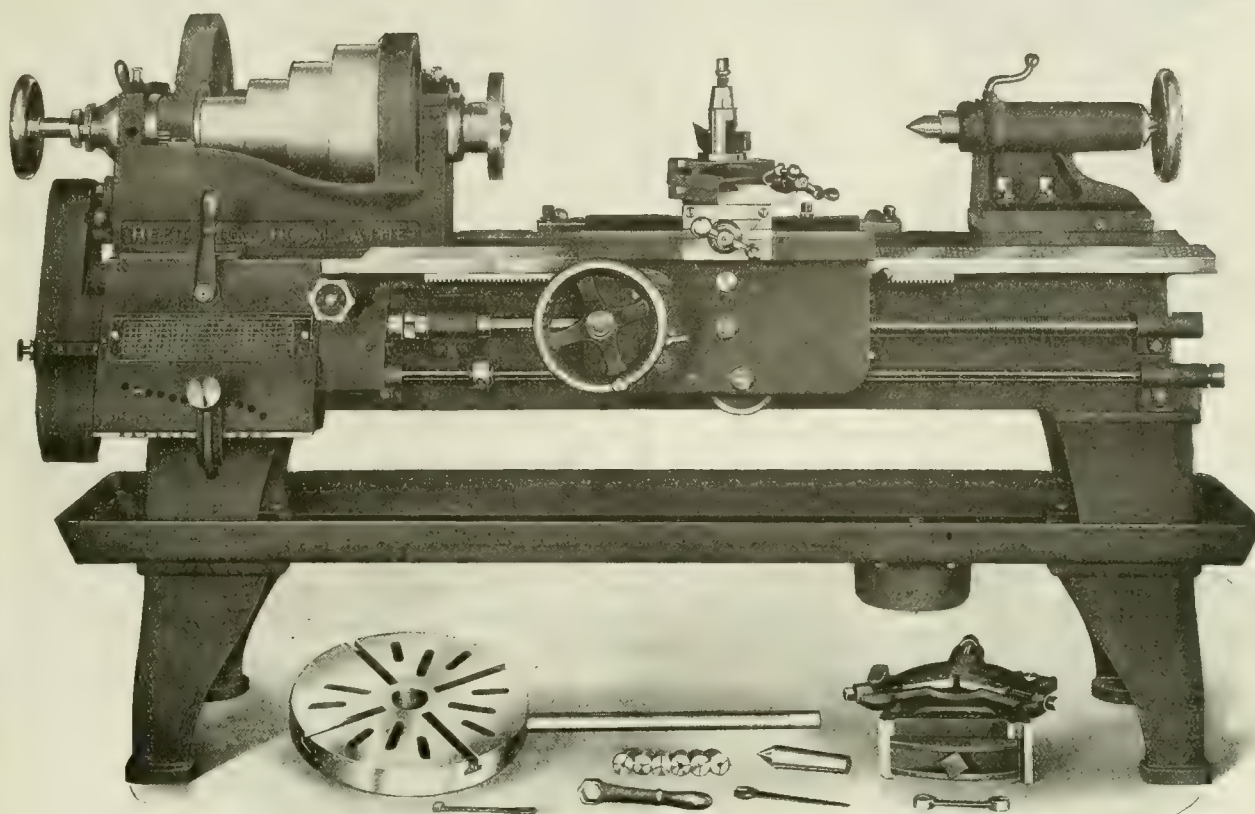
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REED-PRENTICE COMPANY

WORCESTER MASS. U.S.A.



"REED" ACCURACY

YOU CAN TRAVEL PRETTY MUCH ALL OVER THE WORLD AND FIND MEN WHO HAVE AT ONE TIME OR ANOTHER USED "REED" LATHES.

WERE YOU TO ASK THEIR OPINION OF THIS MAKE OF MACHINE YOU WOULD UNDOUBTEDLY BE IMPRESSED BY THE UNIVERSAL REPLY—"ACCURATE."

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Notes on Grinding

NORTON COMPANY,
WORCESTER, MASS.

No. 32A

Don'ts for the Cylindrical Grinding Machine Operator

(1) Don't attempt to grind without using the proper number and proper application of steady rests, if you wish the work to be ground round, true and smooth.

(2) Do not expect to get round work without round center holes in your work and true center points in your machine.

(3) Don't attempt to grind without a quantity of good lubricant flowing over the work and wheel at the point of contact between wheel and work.

(4) Don't put too much compound in the water; the proportion should be about 40 to 1; too much compound causes undue foaming.

(5) Don't allow compound to foam and froth and run all over the machine and the floor. This can be reduced by sprinkling a little kerosene on the foam in the top of the tank or by adding several pails of clear water.

(6) Don't thin the compound so much that there will be no rust preventive in the water; if you do, your machine will become rusty and corroded.

(7) Don't use hard wheels; soft wheels give greater production.

(8) Don't forget to oil the machine thoroughly at least once a day; preferably on starting up in the morning.

(9) Don't use "any old oil" on the wheel spindle. Special spindle oil is provided and is necessary, due to the amount of clearance left between the diameter of the spindle and the diameter of the box, where clearance must just be filled by the oil used. Therefore, the oil used must be of the proper grade and viscosity to accomplish this object.

(10) Do not worry if the wheel spindle runs warm or cold, so long as it grinds round, perfect work.

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Canadian Agents:—The Canadian Fairbanks-Morse Co., Ltd., Montreal, Toronto, Ottawa, St. John, N.B., Winnipeg, Calgary, Saskatoon, Vancouver, Victoria. F. H. Andrews & Son, Quebec, Que.

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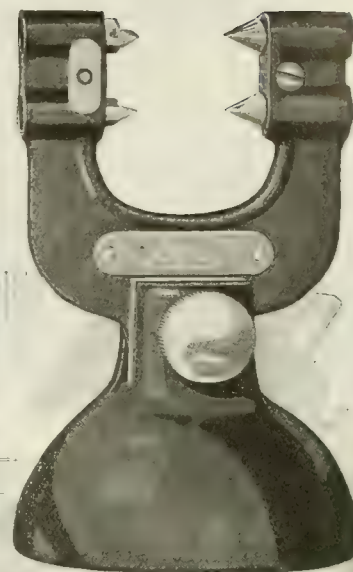
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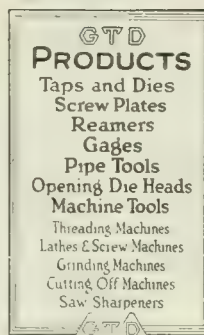


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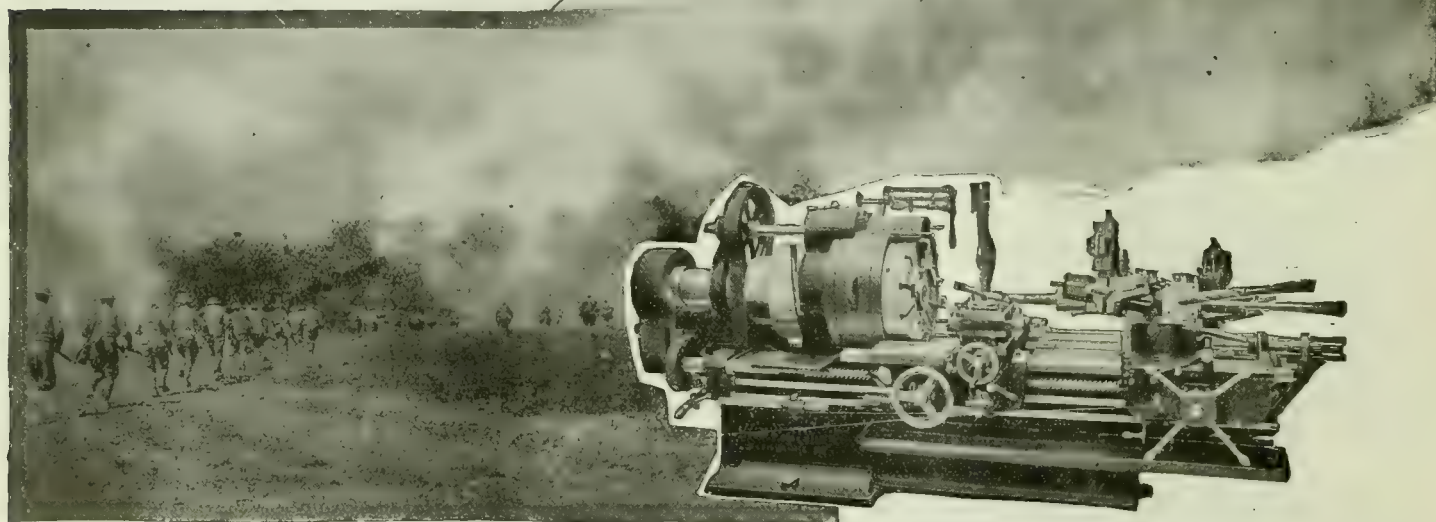
The Drifting Reveals the Scene of Re

*Gisholt Methods
Insure
Accuracy & Economy*

Out of the business of *destroying* there arises the bigger problem of *rebuilding*.

Dependable machines are needed—steady production—the certainty of a satisfactory finished product—advice in the methods of meeting the readjusted demands.

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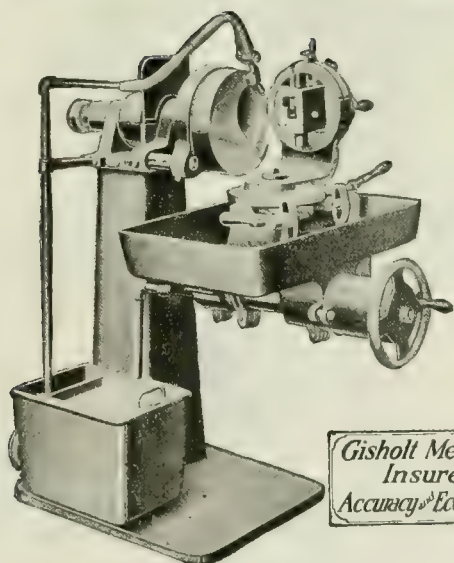
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*Builders of Standard and Automatic
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The question of securing sharp tools can be solved in two ways.

Your skilled men can leave their machines and sharpen their own tools at an emery stand, at the expense of stopping production, or a boy and a Gisholt Tool Grinder can do the tool grinding for the entire shop and release your operators for the more important work of producing finished parts.

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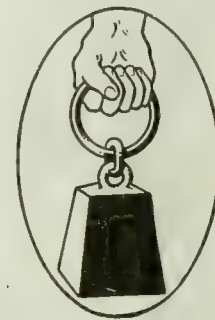
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CANADIAN MACHINERY AND MANUFACTURING NEWS

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March 6, 1919

Electric Steel Plant; Features of Plant Design

A Description of the Layout of the Electrical Apparatus in a Large Electric Steel Plant—High Power Factor and Good Operating Characteristics Resulted From the Layout of the Equipment

By W. F. SUTHERLAND

THE successful operation of an electric furnace plant depends not only upon the skill with which the furnaces themselves are handled, but also upon the care taken in the original layout and design of the plant. This is particularly true of the electrical equipment, which is an essential feature of and also forms a major portion of the cost.

Plant operation may well be divided into two phases, that having to do with the refining of the steel and that pertaining to the control of the electrical energy supplied. Since these two phases are so entirely distinct, and since the electrical equipment is necessarily costly and needs expert attention, it is well to

separate the plant into two distinct portions, the melting house proper, containing the furnaces, and the transformer and control rooms for electrical apparatus.

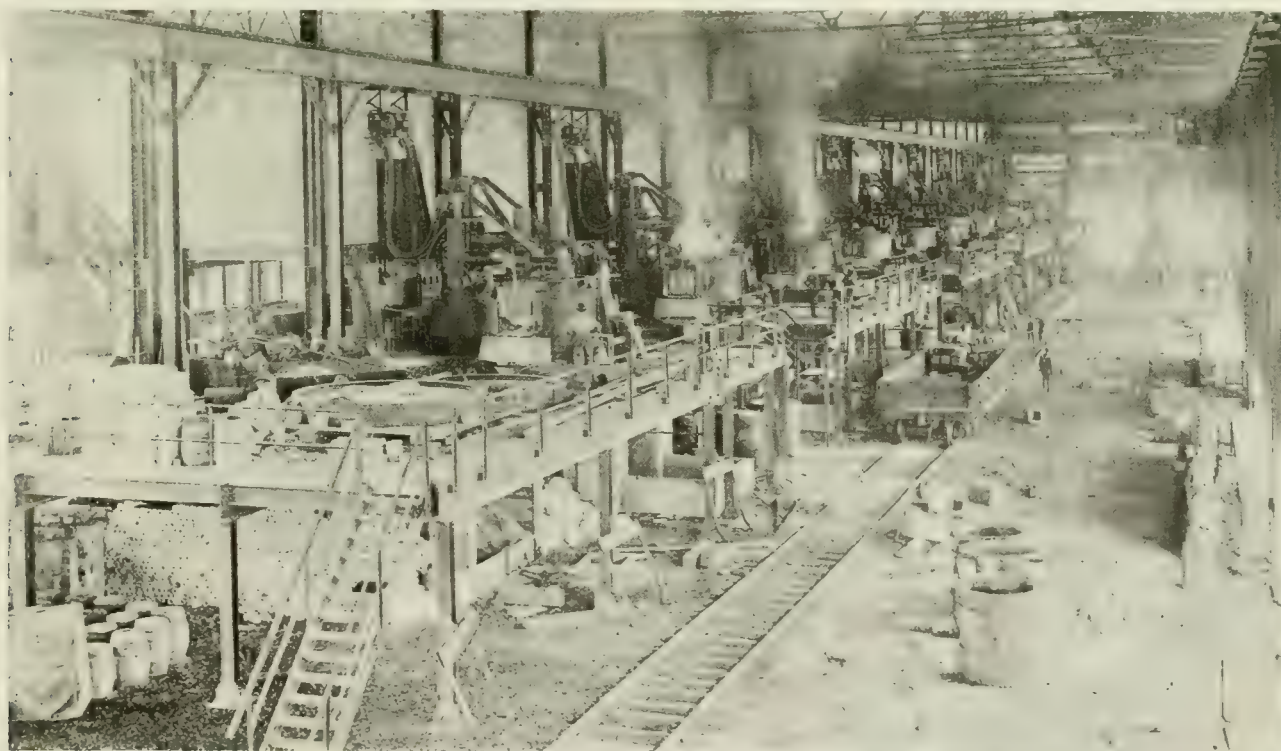
This arrangement was carried out in a very complete manner in the design of the British Forgings plant, a general description of which appeared in CANADIAN MACHINERY of July 26, 1918, and the following article, while applicable to furnace work in general, is also descriptive of the electrical equipment which entered into its make up.

High Tension Lay-out

The high tension apparatus is necessarily dependent upon the voltage used

and also upon the characteristics of the system from which power is obtained. In general design it closely follows standard practice, except that ample circuit-breaker capacity is usually advisable, and circuit-breakers of a higher voltage rating than is necessary from the characteristics of the circuits are used. This is done on account of the variable nature of the load, and also because of frequent interruptions and surges incidental to operation.

Power is received through five 25-cycle, three-phase, 13,200-volt feeders, the sixth being installed but not used. The 250,000 circular mill overhead lines enter through wall bushings, and by reference to Figs. 2 and 3 the connections used



VIEW IN MELTING HOUSE. SHOWING THE TEN 6-TON FURNACES

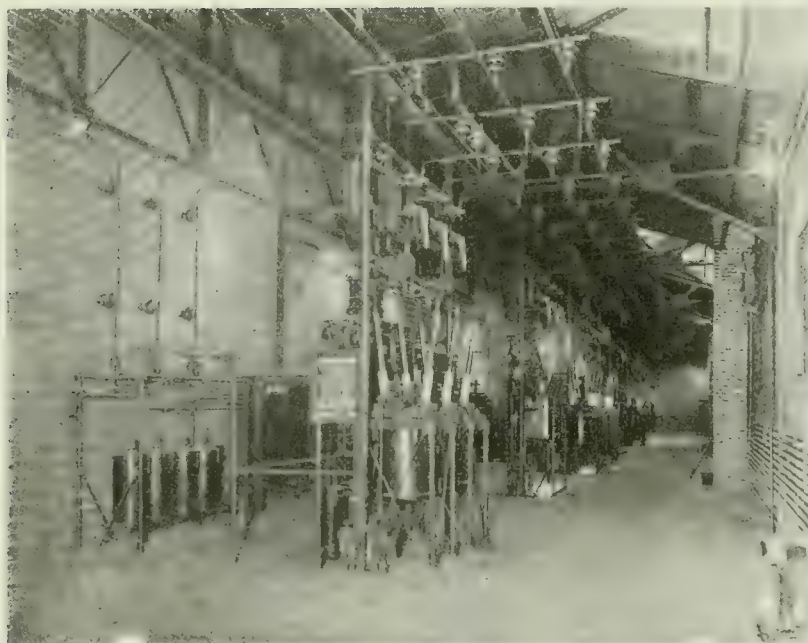


FIG. 1—VIEW IN ONE OF THE TWO TRANSFORMER ROOMS INCOMING LINE SWITCHES IN THE FOREGROUND.

will be seen. Disconnecting switches are installed on both sides of the Westinghouse G 3, 40,000-volt oil switch, and lightning arresters are provided for protection from line troubles. Choke coils are also installed. Two sets of current transformers are installed, one set for meters and control, the other for reverse current relays.

High Tension Bus

A 3-phase, high tension bus runs the full length of the transformer rooms and passes through the control room, on either side of which the transformers are located. This bus of round copper is supported on insulators hung from the roof trusses, and is supplied with disconnecting switches for its proper sectionalizing. Choke coils are also provided at this point for the limitation of disturbances. From this high tension bus all transformers are fed, including service transformers for plant equipment.

Transforming Equipment

For the Heroult 6-ton furnaces, ten in all, 1,500 kv.a. transformers are used. Four were supplied by the Canadian Westinghouse Co., and four by the Canadian Crocker-Wheeler Co. Fig. 6 shows one of the C. G. E. transformers

which was installed. These transformers have the following characteristics, 1,500 kv.a., 3-phase, 25-cycle, oil-insulated, water cooled 13,200/100-volt, 65.5/5,000 amperes.

The high tension side of the transformers is connected up as shown in Fig. 5. The leads taken off the high tension bus are provided with disconnecting switches, and C. G. E. K 24 oil switches, and from the oil switch go to the transformer. The high tension side of the transformers is connected star, while the low tension is connected up in delta, this latter connection being made outside the case and at the furnace, as will be explained later. Two sets of current transformers are provided on the high tension leads, one set for the Thury control and the other for relays and graphic wattmeters.

Low Tension Leads

Power factor is sometimes a serious problem in electric furnace work, and much can be in the design of a plant to obtain high power factor in operation. The greatest source of low power factor in furnace work are the low tension leads from the transformer to the furnace and

their inductive reactance should be kept low. This is done by making them as short as possible and by keeping opposite polarities close together. It is becoming standard practice to interlace the leads from the transformer and to place the delta connection near the furnace.

In the present case, by careful designing, the power factor of the plant was very high, 95 per cent. in fact. This is for the whole plant, and includes a heavy

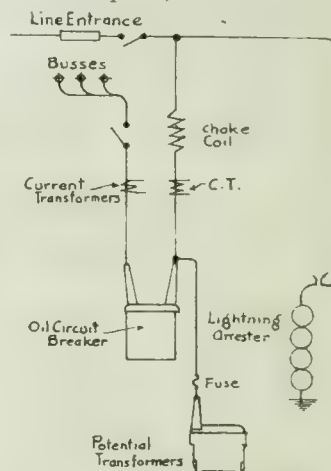


FIG. 3—FEEDER DIAGRAM

induction motor load. The power factor on each furnace averaged 97 per cent., and if everything was clean and in good running order, reached 98 per cent. at times.

The leads were kept short by raising the transformer room floor up to a convenient height. This incidentally was a valuable feature in the plant design in other ways, for it permitted the use of the space underneath for storage bins and for communication with the stock pile outside. The low tension copper was led through an opening in the transformer room wall and was supported by massive insulators from both the wall and also from the crane girder just above. The delta connection is shown in Fig. 7, and it is an interesting piece of design work in flat copper. The furnace catenaries are also shown in the same illustration and the barriers between phases are also clearly visible.

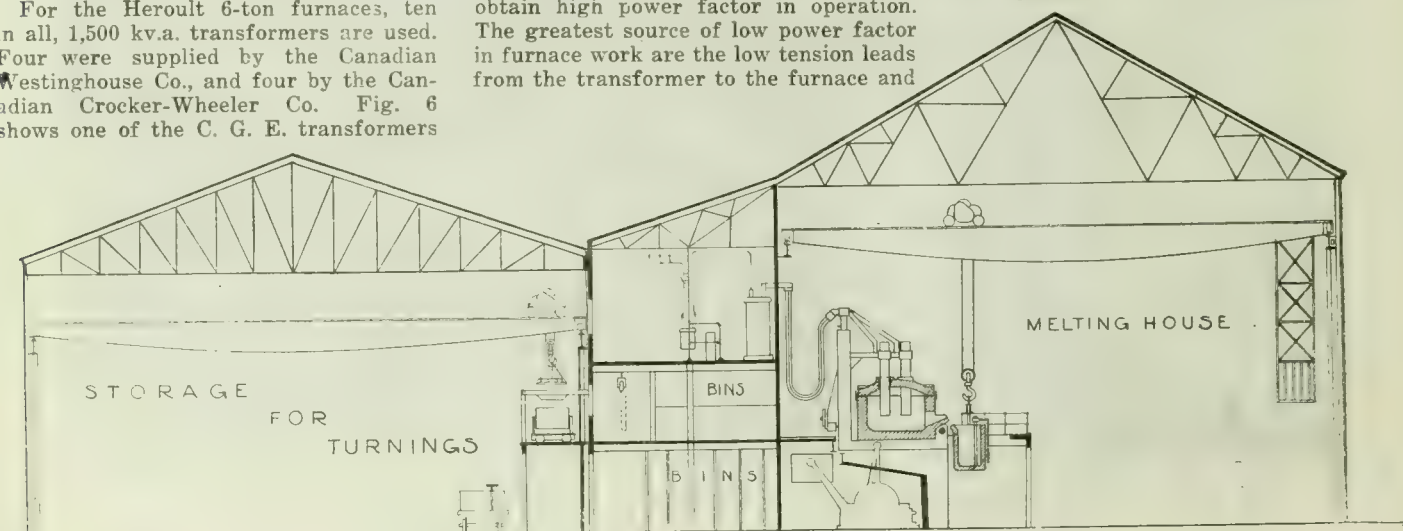


FIG. 1—CROSS SECTION THROUGH MELTING HOUSE TRANSFORMER ROOM, ETC.

Control

The oil switches controlling both the transformers and the incoming feeders are electrically operated and remote controlled, the feeder switches from the control room and the transformer switches from the control board at each furnace. The furnace attendant thus

bottom of the board, while the forge shop feeder and service transformer panel are equipped with C. G. E. plain overload relays in conjunction with a Westinghouse time element feature.

The service transformers mentioned are three in number and are, Packard 300 kv. a., single-phase, 13,200/550-volt

a.c. synchronous motor, 550 volts, 750 r.p.m., direct connected to a 450 h.p. d.c. generator, generating current at 245 volts. The other generator is made by the Crocker-Wheeler Co. and is of 250 kw. capacity.

Meter Board

This switchboard is shown in Fig. 9 and meters the plant load. The left hand panel is a totalizing panel for the plant load and has a graphic wattless component meter in addition to a graphic wattmeter and an integrating wattmeter. The next two panels meter each furnace load separately, and have a graphic wattmeter for each furnace. C. G. E. overload relays and Westinghouse inverse time elements are also fitted for each furnace. Red and green indicating lamps are mounted for each furnace and test links are supplied for testing. The next panel contains, in addition to equipment for two furnaces, a test set consisting of a graphic wattmeter and a graphic wattless component meter, together with an integrating wattmeter. This equipment can be swung on any furnace by means of switches made for this purpose by the Pennsylvania Appliance Co. The performance of any furnace thus can be readily checked up and the instruments on the panel at the furnace calibrated. The fifth panel is for metering the forge plant load. The graphic wattmeters are of Canadian Westinghouse make.

The tilting motor control for each furnace is mounted on the charging platform, where close regulations can be maintained.

The furnace operation is controlled by the Thury system, the ten Thury regula-

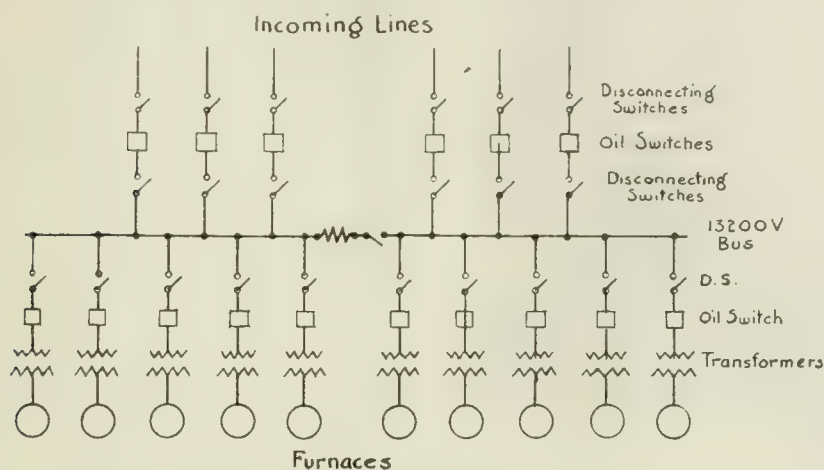


FIG. 2 SINGLE LINE DIAGRAM OF CONNECTIONS. NO SERVICE TRANSFORMERS, ETC., ARE SHOWN

had complete control of his furnace, but over nothing else.

The main control and instrument room located as mentioned before, between the east and west transformer rooms, com-

oil-insulated, water cooled. They supply whatever 550-volt a.c. power is required, and also operate motor generator sets, which run the crane and other variable speed motors around the plant. These motor-generator sets are two in number and are contained in a room under the control room. This room also contains a d.c. switchboard divided into two sections, serving the east and west portions of the plant.

One motor-generator is of Swedish General Electric Co. make, and has an

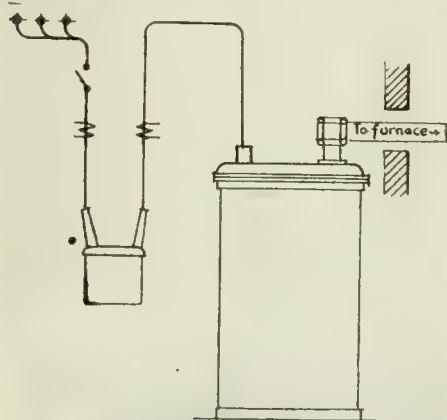


FIG. 5--DIAGRAM OF TRANSFORMER CONNECTIONS.

tained two switchboards, one for the feeders and station service and one for the meter panels for the furnace.

Fig. 8 shows the main control board for the incoming feeders and station service equipment. The first panel to the left is the battery control panel. A sixty-cell storage battery forms part of the equipment, and together with a small motor generator, supplies current for the control of the oil switches. The next panel controls one incoming line and also controls a 13,200-volt feeder which goes to the forge plant direct. The next panel controls two incoming feeders, and next to it is the service transformer panel. The two remaining panels serve to control two feeders and have space for one more each.

The incoming line panels are provided with reverse current relays, seen at the

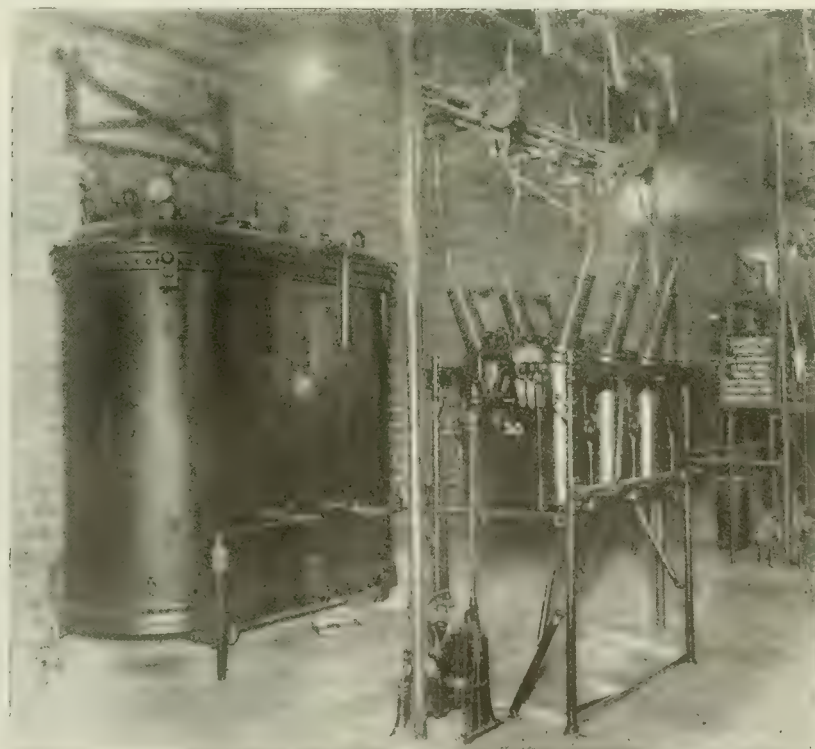


FIG. 14--DETAILS OF TRANSFORMER ARRANGEMENT

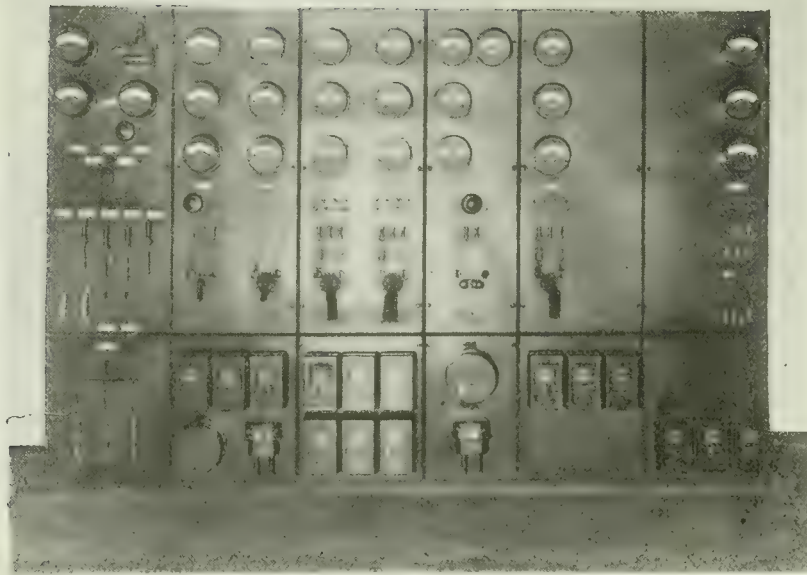


FIG. 5 CONTROL BOARD FOR INCOMING FEEDERS STATION SERVICE, ETC.

tors being supplied by the Volta Mfg. Co., Welland.

ALUMINIUM ALLOY

An alloy of aluminium with 10 per cent. of calcium is reported to be not only lighter than aluminium itself, but to have exceptional merits. It can be readily remelted, does not decompose in water and is more resistant to corrosion than alloys of aluminium with copper, tin, or zinc. In castings it takes on minute details of moulded designs, it machines well and satisfactorily, and is free from brittleness.

BRAZILIAN INDUSTRIES

By M. M.

Owing to the situation created by the war there has long existed for the centres of consumption something like a crisis in the difficulty of obtaining from the producing countries manufactured goods of every description. Practically all the big industrial nations became belligerents, and, incidentally, the consumers were brought face to face with an almost desperate problem—that of supplying their own local needs.

In the case of many countries industrial activities had been neglected in their infancy by reason of the transport facilities, which enabled manufactured goods to be placed on their markets at a reasonable price. The consequent lack of stimulus to develop material activities left their needs to the entire discretion of those more enterprising than themselves. Brazil offered a striking example of this. Her people were accustomed to receive from abroad practically every manufactured article they required.

Conditions changed completely with the advent of the war, bringing a new and unknown situation to be faced. Brazilian energy awoke and, visualizing a long period before hostilities would

come to an end, began to utilize the best of its abilities with the object of giving to the world, in concrete form, one of the convincing proofs of the spirit of industrial enterprise. The task was as great as its achievement.

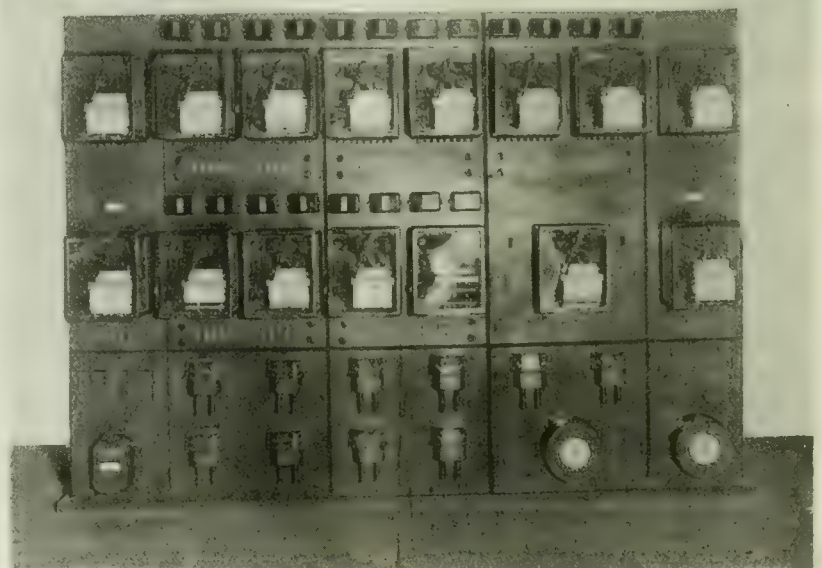
In the course of two years the situation was greatly improved, evident relief being felt everywhere. This was the result of an untiring and persevering endeavor, that served as a revelation when it was disclosed that the country was in the way of industrial emancipation. The effects of this new era of activities attracted accumulated and idle capital, which began to be used to build up new factories, to the benefit both of the individual and national harmony. North and south, capital, brains and labor were engaged in erecting plants for whose pro-

duction the war had opened up a good domestic market.

To-day, according to a very recent industrial census, Brazil possesses such a number of new factories as to place herself in assured protection against any further surprise. In regard to all descriptions of clothing, for instance, the production is already beyond home requirements, and new markets have been found for the surplus output in several of the South American Republics. In this line Brazil will have a place amongst the greatest textile manufacturing countries, for she has, at the very gates of her mills, the highly appreciated raw material that comes from Pernambuco, Piahy, Rio Grande del Norte, Ceara, Maranhao, Bahia, and some of the Southern Brazilian states. The most important factories are located in Bahia, Rio de Janeiro, Sao Paulo and Rio Grande do Sul.

At the beginning of the present year an exhibition of Brazilian cloths, principally cottons and woollens, took place in Buenos Aires and Montevideo with a view to increasing trade in those promising markets. Factories from Rio de Janeiro, numbering about 30; Minas Heraes, 20; Espirito Santo, 1; Pernambuco, 7; Bahia, 6; Rio Grande do Sul, 6; Rio Grande do Norte, 1; Sao Paulo, 30; Sergipe, 8; Alagoas, 5; Maranhao, 2; Santa Catharina, 3, participated in the display, and it can be said without exaggeration that as a result Brazil has found two first-class customers. The Brazilian articles have acquired a high reputation for their excellent quality.

Sao Paulo ranks, as a progressive centre, among the leading manufacturing communities, not only of Brazil, but of the whole South American sub-continent. Since the war began, Sao Paulo has erected the large number of 323 factories, all of which are in full working order. Among them are cloth mills, sugar refineries, coffee mills, and mills for the grinding of cereals; establish-



METER BOARD FOR FURNACES

ments for the manufacture of hats, shoes, knitted articles, stockings, linens, corsets, shirts, tinned goods, preserves, biscuits, sweets and chocolate, flour and starch, rubber goods, briquettes, pipes, vases, butter, lard, beer, furniture, and pharmaceutical products, tobacco, chalk, mica, ice, cement, umbrellas, agricultural implements, toys, frozen meat, and many other commodities, saw mills, and plant for various industrial purposes.

In Rio de Janeiro the number of factories is much greater than the needs of its population and the extent of the demands warrant. Rio is the scene of tireless activity, and, being the metropolis, is necessarily the centre of the industrial effort of the nation. About 150 new factories, mostly cold storage works, have been established in the State of Rio Grande do Sul; nearly 20 in Santa Catharina, 40 in Parana, 15 in Parahyba, and 20 in Para, as is shown by the available census so far reached. The majority of the Brazilian states have not as yet been tabulated. This superficial enumeration of facts serves the purpose of this article, which is to call attention to the marked advance Brazil has actually realized in such a short period.

The erection of a paper mill in the State of Parana, with a capacity of eight tons per month, deserves special mention in view of the alarming shortage of paper. This quantity may appear ridiculously small when compared with the productive capacity of English mills, but when it is considered that the establishment referred to represents an effort to establish in Brazil on a permanent and ever-increasing basis a new industry so essential to the large number of newspapers and other indispensable requirements, it shows plainly the benefits of even such a concern to the country.

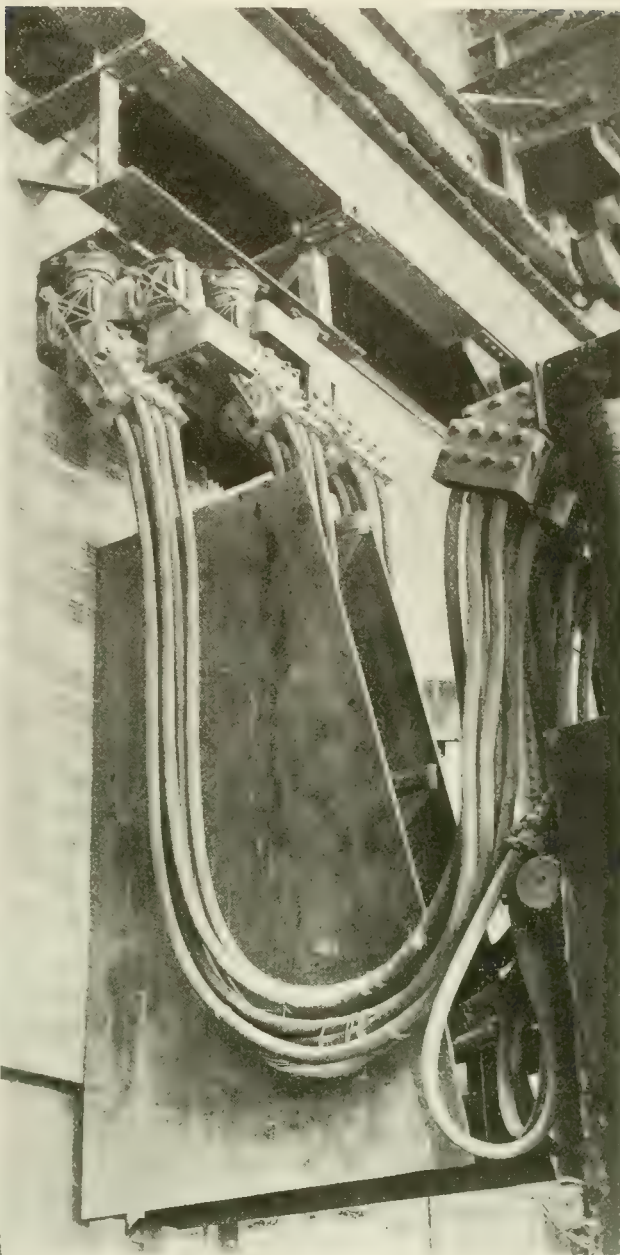
The State of Parana is destined to be one of the most important factories in the life of Brazil in consequence of its exceptionally favorable conditions for the expansion of foreign capital in the most remunerative investment of the day—cattle-breeding for meat production. Its pastures are of the richest.

Thus, Brazil is demonstrating the capacity of supplying her markets to her own benefit, together with a gratifying encouragement to future generations, which, no doubt, will endeavor to confirm Mr. Roosevelt's prophecy that Brazil will be the country of this century.

OILS AND THEIR USES.

By M. E.

Everyone knows something about the usefulness of oils in the workshop, but there are a great many who employ them indiscriminately, thereby making more or less serious mistakes. A little general understanding and common sense is necessary and also a little discernment as to the nature of the oils which are in everyday use. A very common mistake is to oil a sewing machine, bicycle, pram or clock with any kind of oil which happens to be handy. Frequently these are oiled too often, and yet again they are oiled too seldom, being left till they squeak. Then they are given too much oil, often of the



DELTA CONSTRUCTION AND CATENARIES TO FURNACE.

wrong sort, and then there is more trouble. The right oil to use for a clock, no matter what sort it is, is clock oil, which is clean, thin, lubricating oil that does not dry or get sticky. It is also suitable for any light machinery. The least possible touch of oil on the working parts only of clock will suffice, and, as the movements are slow, they do not need it often. Now if this oil were used for sewing machines and the like they would require it too often, so a machine oil with more body is best used very lightly, but as frequently as may be needed to keep all the parts slightly greased. Fast running machinery requires oiling the oftenest. Whereas once a year might do for a clock, once a day would be necessary for a machine in constant use. And the heavier the machinery the heavier the oil should be; engine oil is really heavy machine oil. Linseed oil, in appearance, might seem to be a good lubricant, but it is alto-

gether unsuitable. It dries like a hard varnish, and, of course, would clog any machinery almost as badly as varnish would, except that it hardens slowly. If a piece of rag that has been used in sperm oil, and another wet with linseed oil, be left exposed to dry air for a considerable time, the former will be still the same, but the latter will have become stiff and heavy. For this reason it is quite unfit for using on hones and whetstones when sharpening tools, for it makes them hard and useless, but it is often used in workshops, and thus many workmen have spoiled their stones before finding the reason out. If used for oiling the bright blades of saws or other tools, it makes them brown and varnishy. But linseed oil is the very best for rubbing into the wood parts of tools to keep them clean, and it imparts a hard finished surface. For wood-working and polishing it is invaluable; also in the manufacture of varnishes, oilcloths and imitation leathers. Boiled linseed oil is the only kind for mixing paint, or it would never dry. The more it is unadulterated the longer it takes to dry. It is also essential for making putty; the best is made from raw linseed oil and whiting. Very often cotton-seed

oil is used as a substitute for linseed oil, but it is a very poor substitute. Linseed oil is useful for domestic purposes in reviving varnished furniture and leather goods. It is sometimes employed for machine belting but castor oil is considered best for the purpose, also for the leather of bellows and such like articles, where suppleness and durability are required. As it is expensive however, palm oil makes a good substitute. Petroleum or paraffin, besides being the recognized burning oil for lighting and heating purposes, is excellent and cheap for cleaning the working parts of machinery before lubricating. It is good for thinning down machine oil before lubricating, and makes a capital lubricant for locks and light machinery, if a little sperm oil is added. For sharpening tools on the whetstone many workmen prefer it to any other.

You Can't Get Too Much Arithmetic

Not long ago CANADIAN MACHINERY was discussing the question of apprenticeship problems with one of the most successful shop managers in this district. One statement he made regarding the schooling that an apprentice needed if he were going to go ahead with his work was to the effect that he could not get too much arithmetic. His own experience he summed up as follows:

"When I had been at my trade about a year I began to see that I was going to end up against a stone wall. At the end of my second year I could already feel that stone wall with my elbows. I wanted to do better work, but I did not know how. I wanted to do old things in a shorter and more certain manner, but I had not the method at my disposal. Sum it all up and I can say that I did not know enough. The one thing I needed above all else was arithmetic. That is one thing I would say to any apprentice who intends to follow his trade through and get into some of the worth-while positions. Learn all there is to get about arithmetic. Become an expert at shop arithmetic. It will pay all the time."

How to Get Training

There are shop managers who have had to dig this training up as best they could. We can recall off-hand a dozen who have turned to night schools, correspondence schools and technical books and papers for the training they did not get while they were attending school.

CANADIAN MACHINERY will begin next week the publication of a series of articles on "Shop Arithmetic."

It will begin right at the beginning. It will aim to start at a point where a person with an ordinary public school knowledge of arithmetic can follow the problems and directions, and from then on it will advance, step by step, through the working out of problems that are met with in any of the shops where good work is done.

The series is being conducted by James H. Rodgers, Montreal, associate editor of CANADIAN MACHINERY. He has given a great deal of attention to this matter. He knows from actual experience in the shop just the sort of material that is needed, and in this series he will give it in such a way that the apprentices can follow and absorb it.

It would be a good idea for mechanics, other than apprentices, who have not followed the question of shop arithmetic as closely as they might, to get in touch with this series. It may be that you have given considerable attention to the matter. If so you may be able to suggest plans that are not covered and points that are not made in this series.

The best way is to follow the series from week to week. Draw the matter to the attention of others whom you may think need such study. Cut the pages out week after week. Put them away and get a binder. If this is done you will have a lot of material that will be valuable for reference purposes, and which may be the means, in after years, of helping some young mechanic to get the mathematical training he requires.

Watch for the shop arithmetic series. They will start in the next issue of CANADIAN MACHINERY.

The Design of High Pressure Valves and Fittings

The Author, in a Paper Read Before the American Society of Mechanical Engineers, Describes the Joints, Fittings and Valves Used on a 7,500-lb. Per Square Inch System, Both Those That Proved Satisfactory and Those That Failed Being Discussed

By WM. W. GAYLORD

WITH the greater use of hydraulic machines of various sorts as the result of the large manufacture of munitions, a greater interest is to be expected in the design of valves and fittings for such machines. This paper gives the results of my experience, and I have written it largely in the hope that others may be led to publish the results of theirs.

2. A few years ago, when the problem was presented to me of designing a new hydraulic system for a working pressure of 5,000 lb. per sq. in., with the probability that this would be increased to 7,500 lb. per sq. in., I found there had been very little published on the design of valves and fittings for this pressure, and that the designing formulae given in standard handbooks were either incorrect or unsatisfactory. The formula most generally given was that of Lamé, based on the maximum-stress theory, which, while correct for cast iron, is not satisfactory for steel. Lanza, in his "Applied Mechanics," gives a modification of the Grashof formula, based on the maximum-strain theory, which I had used before with fair results for steel fittings on lower pressures. I had, however, noticed some unaccountable failures when applied to the pipe and fittings of a system using a working pressure of 4,000 to 4,500 lb. per sq. in.

3. While studying these failures my attention was called to the maximum-shear theory proposed by Guest, and this seemed to explain most of them. About this time the results of the experiments of Cook and Robertson were published in "Engineering" (December 15, 1911), and after considerable study I became convinced that these offered the best basis for design.

4. The form in which they give the formula for fiber stress, based on the maximum-shear theory, is:

$$\frac{P}{f} = \frac{K^2 - 1}{2K^2}$$

where P is the internal pressure in pounds per square inch, f the fiber stress, and K the ratio of external to internal diameter. This is the equivalent of the usual formula:

$$f = P \frac{2}{1 - \frac{d_i^2}{d_o^2}}$$

where d_i is the internal diameter and d_o the external diameter, as can be seen

by substituting $\frac{d_o}{d_i}$ for K ; thus:

$$\frac{P}{f} = \frac{\frac{d_o^2}{d_i^2} - 1}{2 \frac{d_o^2}{d_i^2}} \times \frac{d_i^2}{d_o^2} = \frac{d_o^2 - d_i^2}{2d_o^2}$$

whence

$$2Pd_i^2 = f(d_o^2 - d_i^2)$$

or

$$\frac{P}{f} = \frac{2d_i^2}{d_o^2 - d_i^2} = \frac{2}{1 - \frac{d_i^2}{d_o^2}}$$

5. The results of their experiments show that if a factor of 1.2 were introduced, the equation would more nearly represent the actual results, so the formula suggested by them becomes:

$$\frac{P}{f} = 1.2 \frac{K^2 - 1}{2K^2}$$

6. This formula I transformed to give the thickness of cylinder wall t for cylinder of inside radius r by substitut-

ing $\frac{r+t}{r}$ for K ;

thus:

$$\frac{P}{f} = 1.2 \frac{\left(\frac{r+t}{r}\right)^2 - 1}{2 \left(\frac{r+t}{r}\right)^2} = \frac{0.6(r^2 + 2rt + t^2 - r^2)}{r^2 + 2rt + t^2} = \frac{0.6(2rt + t^2)}{r^2 + 2rt + t^2}$$

or

$$Pr^2 + 2Prt - Pt^2 = 1.2r^2t - 0.6ft^2$$

Transposing,

$$0.6ft^2 - Pt^2 + 1.2ftr - 2Prt = Pr^2$$

or

$$(0.6f - P)t^2 + 2(0.6f - P)rt - Pr^2 = 0$$

and

$$t = -r \pm \sqrt{r^2 + \frac{Pr^2}{0.6f - P}}$$

which makes it much more convenient for general use.

7. From this formula it is apparent

that a material having a working fiber stress of 12,500 lb. sq. in. or less would not be safe, however thick the pipe wall. This, of course, eliminates bronze, cast iron and semi-steel as materials for making these fittings. After careful consideration of the materials available it was found that cold-drawn, seamless steel pipe annealed to give 45,000 lb. per sq. in. elastic limit, and steel castings for fittings giving 30,000 to 35,000 lb. per sq. in. elastic limit, could be obtained, and it was decided to use these. As the system had no accumulator and therefore was not subjected to severe shocks, a working fiber stress of 0.6 of the elastic limit was used.

8. The largest pipe in the system was to take the discharge of five pumps, each of 60-gal. per min. capacity, making a maximum flow of 300 gal. per min., but most of the time only three pumps or 180 gal. would be used. In view of this a maximum velocity of 20 ft. per sec. or a usual velocity of 12 ft. per sec. was allowed, which required a pipe of 2 3/4 in. inside diameter. From the above formula the thickness required for a pipe of 2 3/4 in. inside diameter is

$$t = -1.375 \pm \sqrt{\frac{7500 \times 1.375 \times 2}{0.6 \times 27000 - 7500} + 1.375^2}$$

$$= -1.375 \pm \sqrt{\frac{28360}{17400} + 1.891} = -1.375 \pm 1.871$$

$$= 0.51 \text{ in.}$$

and for a fitting

$$t = -1.375 \pm \sqrt{\frac{7500 \times 1.375}{0.6 \times 19500 - 7500} + 1.375^2}$$

$$= -1.375 \pm \sqrt{\frac{28360}{8400} + 1.891} = 0.925 \text{ in.}$$

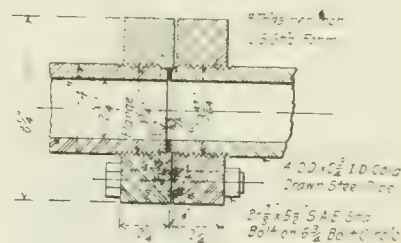


FIG. 1. TYPICAL FLANGED JOINT FOR 7,500 LBS. PER SQ. IN.

9. A pipe having 4-in. outside and 2 3/4-in. inside diameters was chosen, as this was a commercial size and allowed the necessary thickness of metal for threading in a joint of the type shown in Fig. 1. The fittings were made with a 1-in. wall thickness, the tee shown in Fig. 2 being an example of the type used.

10. The bolting of the flange was

figured by assuming that the full pressure was applied to the area of a circle of the outside diameter of the gasket. In the joint in Fig. 1 this would make a total load on the bolts of $1.875 \times 3.142 \times 7,500 = 83,150$ lb., which would require eight $1\frac{3}{8}$ -in. bolts if U.S. standard bolts were used, allowing a working fiber stress of 10,000 lb. per sq. in. This would have taken a flange about 11 in.

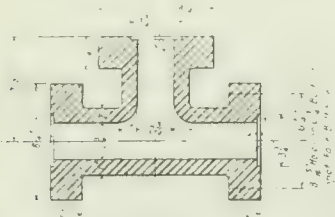


FIG. 2 - TYPICAL FLANGED FITTING FOR 7,500 LBS. PER SQ. IN.

in diameter and would have made the piping very hard to install in the limited space available, so it was decided to use bolts made to the S.A.E., or, as it was then known, the A.L.A.M., standard. Using a working stress of 22,500 lb. per sq. in., this allowed the use of eight $\frac{7}{8}$ -in. bolts in an $8\frac{1}{4}$ -in. flange. This is open to the objection that a careless mechanic may replace these special bolts with standard bolts and thus cause the failure of the joint, but there has been no trouble from this cause.

11. When the piping was installed, some of the gaskets were of soft copper and the rest of red fiber, but experience has shown red fiber to be more satisfactory as the copper soon hardens and a slight water hammer will often start the joints leaking, while the red fiber does not give this trouble.

12. The system was to supply three machines from a group of five pumps, and the piping was to be so arranged that the large machine, which was to use pressures up to 7,500 lb. per sq. in., could be operated with any or all of the pumps, while the other two machines were to be operated with one or two

pumps each, but the connections were to be so made that any pump could be connected to any machine. This was done by using a manifold tee on the discharge of each pump with a valve connecting to each pipe line.

13. The valves originally put in were of two types; one a wedge gate valve with cast-steel body and hard bronze wedge, the other a stop valve for the balanced type having a cast-steel body and bronze plunger. The gate valves proved impracticable as the bodies could not be made sufficiently rigid to prevent distortion of the seat and the starting of a leak which would grow very rapidly because of the cutting action of the water. The other valves were more satisfactory and could be kept fairly tight by frequently dressing the seat and plug; but it was found more satisfactory to use blank flanges and pipe spools in place of the valves to make necessary changes in connections.

14. The machines were in effect single-acting presses in which the ram was returned by an auxiliary low-pressure system. The main operating valve therefore became a bypass valve which was closed to drive the ram forward and opened to allow the ram to stop and be returned. The valve in Fig. 3 was chosen for this place and was first made without the loose connection shown in the stem, but it was found very hard to open it after it had been shut tight, so the connection was added and this difficulty overcome. Experience had shown that the form of seat used with the beveled recess for the plug would last much longer than if the valve had a flat seat.

15. This system has been in use five years, often with a working pressure of 8,000 lb. per sq. in. for short periods, with no failures and, with the exception of the valves mentioned, has given good satisfaction.

16. On two similar systems more recently installed for operating pressures of from 4,000 to 5,000 lb. per sq. in. the same type of pipe and fittings has also been used with success. The operating

valves furnished for these systems were made as shown in Fig. 4 and proved unsatisfactory, as the water pressure on top of the plug held the valve closed so that it was almost impossible to open it. These were replaced by valves similar to Fig. 3, which are working satisfactorily.

17. These machines had an exhaust valve as shown in Fig. 5 which returned

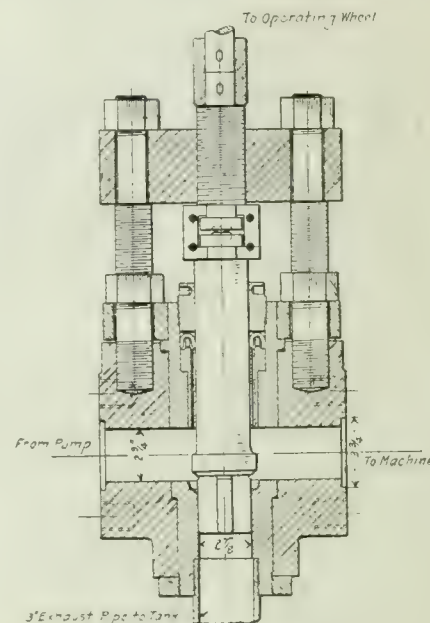


FIG. 3 - OPERATING VALVE FOR 7,500 LBS. PER SQ. IN.

the water direct from the main cylinder to the tank on the return stroke of the ram. These gave much trouble by the intermediate piece between the valve body and operating cylinder breaking through as indicated. This in two cases blew the operating cylinder entirely off the valve body. Two of the valve bodies also failed by splitting. In view of this and the fact that a leakage through the U-leather packing might also blow the operating cylinder off, it was decided to redesign this valve, using a cast-steel

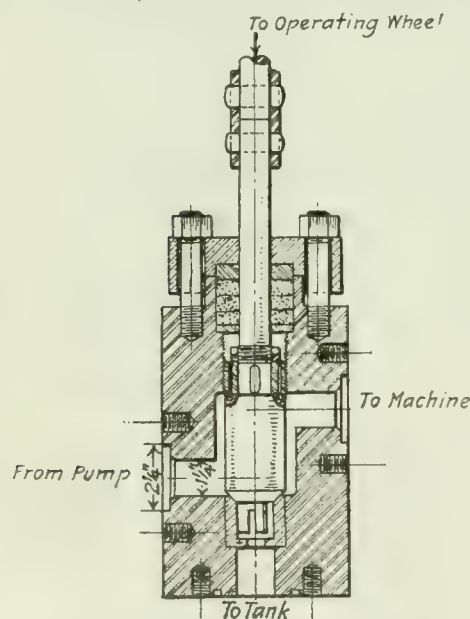


FIG. 4 - OPERATING VALVE FOR 5,000 LBS. PER SQ. IN. (UNSATISFACTORY DESIGN)

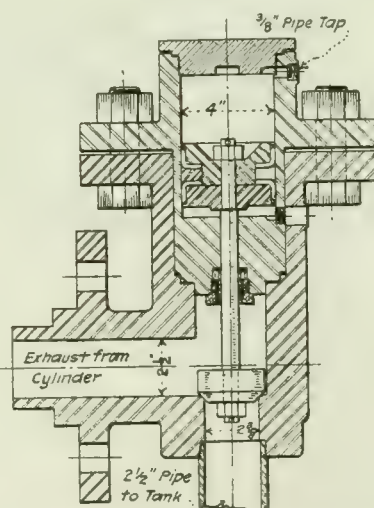


FIG. 5 - EXHAUST VALVE FOR 5,000 LBS. PER SQ. IN.

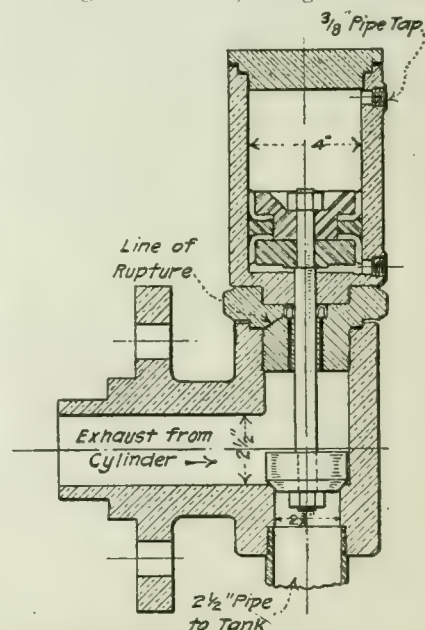


FIG. 6 - EXHAUST VALVE FOR 5,000 LBS. PER SQ. IN. (UNSATISFACTORY DESIGN)

body and cylinder arranged to eliminate these faults. Fig. 6 shows this valve, and, although it is rather difficult to build, it has proved very satisfactory in operation.

18. On a smaller press having three double-acting cylinders designed to operate in regular sequence, a multiple valve of the semi-balanced spring-closed type, shown in Fig. 7, was used, having the individual valves opened by bell-crank levers moved by face cams mounted on a common shaft. The cams were so arranged that rotation in one direction would cause the cylinders to operate in the proper order. The valve was so designed that when open, the area through the seat was greater than around the stem, thus reducing the velocity of water through the seat and largely eliminating the cutting of the seat. Fig. 8 is a key plan of Fig. 7. Fig. 9 is a section through one of the valve seats of Fig. 7, showing areas.

19. This press is connected directly to the pump through this valve, and it has proved much more satisfactory than the four separate valves which it replaced, one bypass and three reversing, as a careless operator cannot work the valves in the wrong order and break the press.

20. The piston rod in the large cylinder of this press is two-thirds the diameter of the piston, and it was found that when

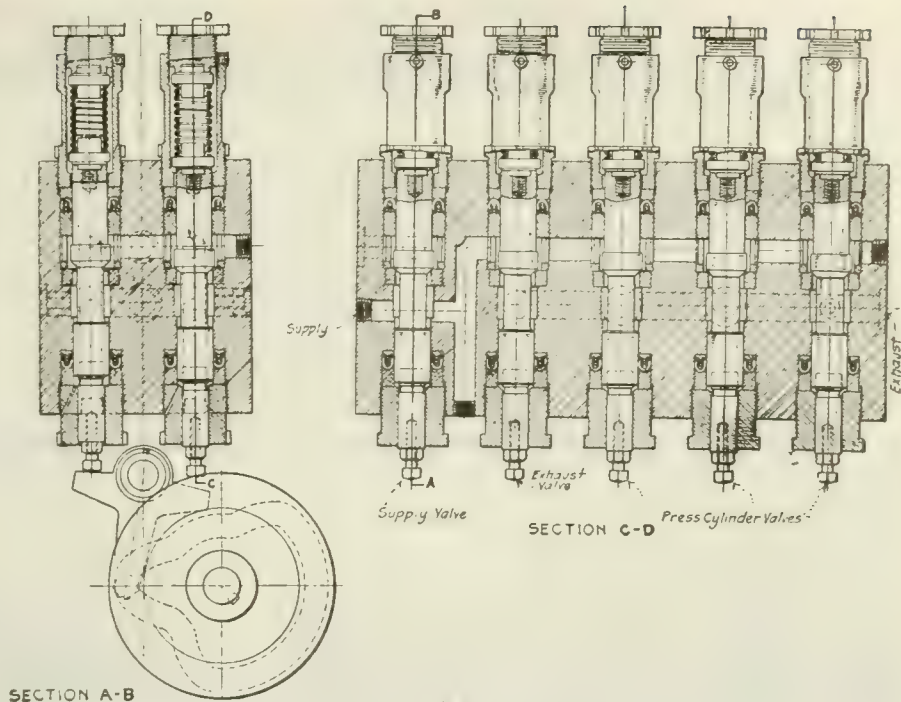


FIG. 7—MULTIPLE OPERATING VALVE. (SEE KEY PLAN IN FIG. 8).

valve and materially increased the speed of the press.

22. As the highest pressure used in this system was 1,500 lb. per sq. in., double extra strong pipe and malleable-iron extra heavy hydraulic screwed fittings were used and have proved satisfactory.

23. In designing valves and fittings for service on accumulator systems, I have found that it is usually the severity of the water hammer rather than the actual pressure that determines the strength required, and that in laying out such a system, all possible care should be used to avoid trouble from this source. However, as the severity of water hammer in a new system can never be exactly determined before it is in operation, I have used the designing formula given in the first part of this paper, with a working fiber stress of one-third to one-half the elastic limit of the materials employed, depending on the prob-

minimum time of closing the valves. This at best can only be a rough check, but it has proved sufficient in several cases. The piping of such a system should be so supported and anchored that water hammer will not cause any considerable

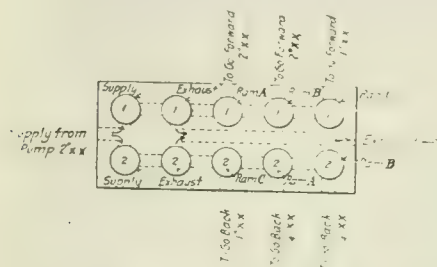


FIG. 8 KEY PLAN, SHOWING ARRANGEMENT OF VALVES IN FIG. 7.

the speed of the press was increased by speeding up the pump, the valve controlling the head end of the cylinder was too small to allow the water to escape quickly enough on the return stroke of the ram to prevent a rise in pressure in the opposite end of the cylinder and consequent blowing of the relief valve at each stroke of the ram.

21. After considerable experiment it was decided that the best way to overcome this difficulty would be to devise some method of returning the water from the head end of the cylinder direct to the suction tank of the pump on the return stroke of the ram. This was accomplished by inserting the valve shown in Fig. 10 in the pipe between the operating valve and the head end of the cylinder. As will be seen from the figure, the upper valve will open when water is admitted from the operating valve, while the lower valve will be held closed. When the pressure from the operating valve is relieved and the ram starts to return, the lower valve will open and the upper valve close, thus returning the water direct to the tank through the 2-in. pipe. This eliminated practically all trouble with the operating

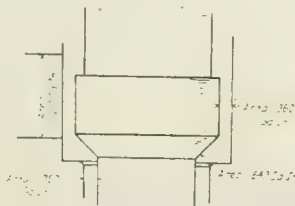


FIG. 9—SECTION THROUGH VALVE SEAT OF ONE OF THE VALVES IN FIG. 7, SHOWING AREAS.

able severity of shock from this cause. This I have attempted to check by figuring the rise of pressure to be expected due to the inertia of the moving parts of the accumulator if all operating parts of the accumulator should be closed at the same time. This is done by assuming the ram of the accumulator to be coming down with a maximum velocity and figuring the force necessary to cause a negative acceleration sufficient to stop it in an assumed

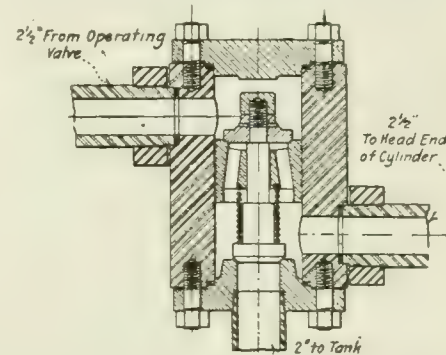


FIG. 10 VALVE FOR BY-PASS TO TANK ON RETURN STROKE.

whip in the piping, as this is the usual cause of broken fittings and leaking joints.

24. The valve most used to control single-cylinder machines like draw benches on an accumulator system is a combined throttle and reversing valve, while the valves for multi-cylinder machines are too numerous and complex to describe in this paper, but the principles used in their design are the same as for the valves already described, except that greater care must be exercised to prevent too rapid opening and closing, and consequent destructive water hammer.

German substitutes for rubber in automobile tires were many and ingenious. Some of the many materials used were tyres of hides, skins, leather, fibre, rope and cordage; woven fabrics, felted yarns, paper and pasteboard bristles; wood, cork, celluloid, and elastic substances of various kinds.

Attractive Homes for Employees

Canadian Industry Solves Housing Problem With Much Advantage to Employees—Cheap Rent, Cheap Coal and Free Light, Combined With Attractive Houses, Make This Community Popular

By W. F. SUTHERLAND



THE housing of the workman is receiving a large amount of attention, and justly so, for the industrial developments of the last few years have to a large extent altered conditions formerly encountered. Many industries have sprung up in districts remote from large centres, and even the cities themselves have felt the pressure incidental to the increased numbers of workers in the munition plants, which have been operating in such large numbers. The Governments of many of the Allied countries have taken considerable interest in this phase of the labor problem, and many firms have themselves gone to considerable expense to create satisfactory conditions for their employees.

One of the most interesting of these private housing schemes has been worked out by the Norton Company, both in Canada and in the United States. The industrial community created by the Norton Company at Indian Hill, near Worcester, was described in CANADIAN MACHINERY several months ago and the present article treats of the developments which have recently been completed at Chippewa, where their Canadian plant is located. The problems encountered in each place were widely different and lead to a somewhat different treatment of the Canadian project.

The location of the Norton Co. at Chippewa, while ideal from the standpoint of power supply and industrial

facilities, was somewhat at a disadvantage as regards housing conditions for employees. Houses were scarce and unsatisfactory, and rents were high, necessitating the employees living at Niagara Falls and coming to work by street car, the night shift having a car service at only one hour intervals.

To ameliorate these conditions the company started a comprehensive housing scheme in 1916, the major portion of which has recently been completed. Land, which was formerly a cow pasture and swamp, is now filled in, graded, with well built roads and lighting, and forms the nucleus of an exceedingly attractive community.

Layout

The community is located somewhat to the south of the plant and centres around a new cross street, which intersects the main approach to it.

This street, together with that leading to the plant, has been graded, paved, sidewalks put down and made attractive by the planting of trees and the wise utilization of those already grown to full size. An additional pavement has also been put down for the space of several blocks to provide a satisfactory means of entrance from the village of Chippewa proper.

The types of houses developed by the architects, Wright and Kremers, of Niagara Falls, N.Y., are vastly different from those usually met with in industrial communities. All too frequently in



THIS ILLUSTRATION SHOWS A TYPICAL SINGLE AND A TYPICAL DOUBLE HOUSE.

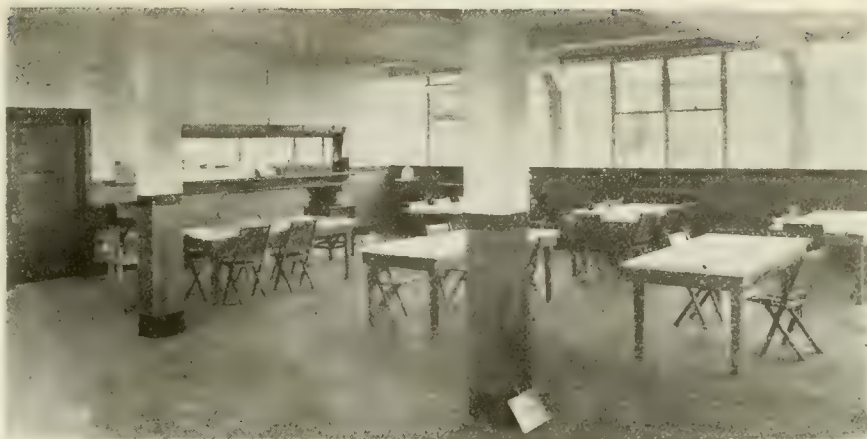
new developments one sees block after block of houses the same in every respect, closely jammed together and with no attempt made to relieve the monotony by varying the architectural features of individual houses, if, indeed, they have any.

In the development here described, the value of plenty of yard space for each unit was well considered. Each house, or double house, is set well back from the road, with an ample back-yard and a uniform street line has been carefully avoided. In a typical block the central feature will be found to be a double house of substantial appearance, set well back from the road. On each side of it the houses approach the road more nearly, the corner houses of each block being the nearest to the street line. The houses are symmetrically disposed as regards their type on each side of the central feature, or double house, and while this is done, the exterior features are arranged in such a manner that no appearance of similarity exists. One house may have shingled walls, and its counterpart in plan will be given an entirely different appearance by the use of clapboard siding, and a different verandah treatment.

The Vanished Back-yard Fence

That eyesore of the city and town, the backyard fence, is only conspicuous by its absence, and the hedges, which have been planted in its stead, will, with each passing year, grow more attractive and will make the back-yard a place of beauty, instead of a depository for ashes and tin cans.

Along with this improvement goes one which also helps towards the attractive



THE COMPANY RUNS A WELL APPOINTED CAFETERIA FOR EMPLOYEES

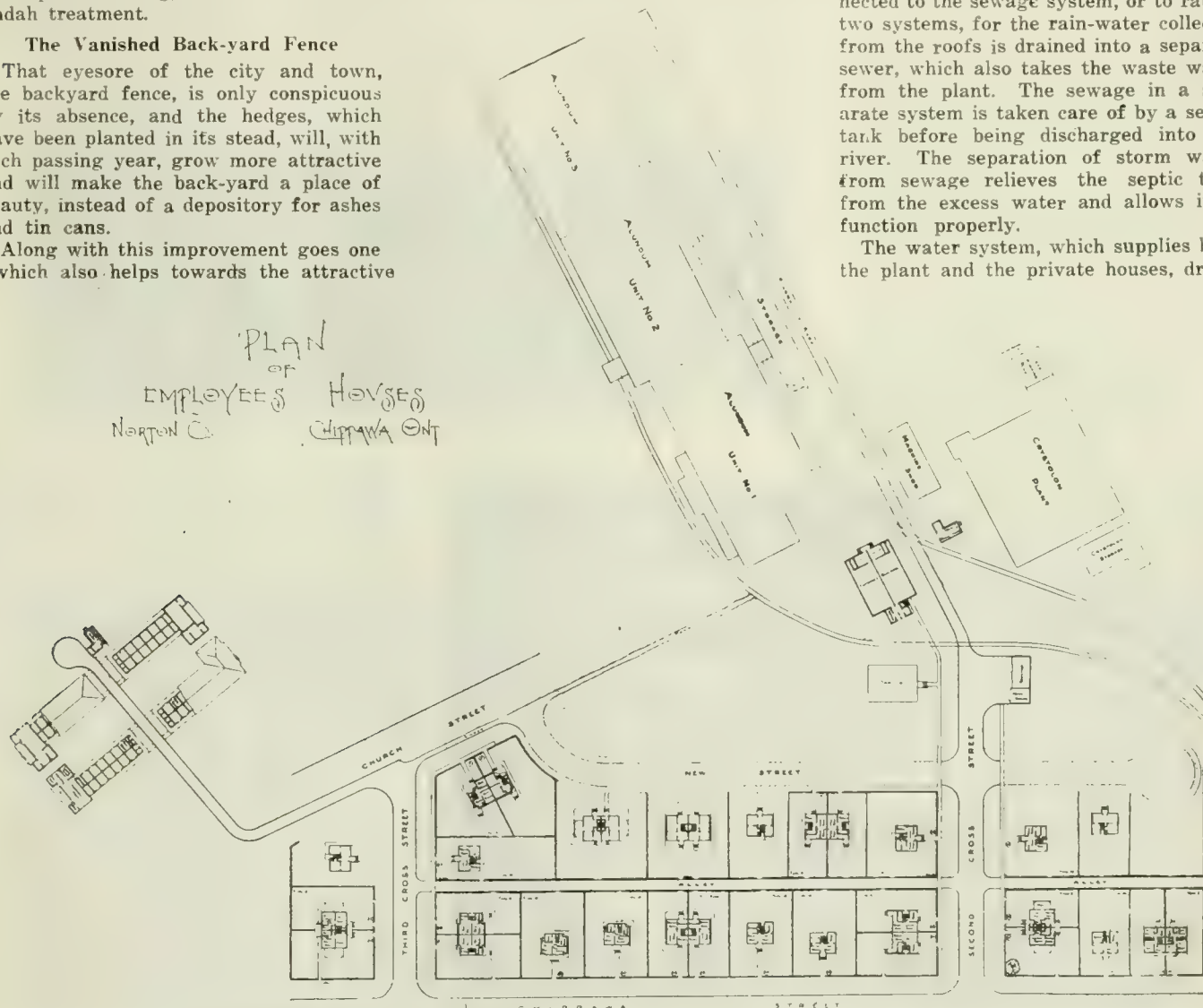
appearance of the community. No one will admit that the twice a week appearance of ash and garbage cans on front lawns is an aid to civic beauty. This has been avoided in the present instance by the provision of a through lane, serving every house in a block. Through this lane all coal is delivered and all garbage collected. The garbage

cans are chained to posts so that their removal is a matter of some difficulty

Sanitary Provisions

Since the Village of Chippewa has no sewage or water systems, the company have considered it good policy to provide both for the community which they have established. Every house is connected to the sewage system, or to rather two systems, for the rain-water collected from the roofs is drained into a separate sewer, which also takes the waste water from the plant. The sewage in a separate system is taken care of by a septic tank before being discharged into the river. The separation of storm water from sewage relieves the septic tank from the excess water and allows it to function properly.

The water system, which supplies both the plant and the private houses, draws



PLAN
OF
EMPLOYEES' HOUSES
NORTON CO. CHIPPEWA ONT.

PLAN FOR HOUSING DEVELOPMENT AT THE CHIPPEWA PLANT OF THE NORTON CO.



THE FIRST AID ROOM IS COMPLETE IN EVERY RESPECT.

its supply from the Welland River. A duplicate chlorinating plant is installed, a vital necessity when it is considered that even "the bright, sparkling well water" of the village was highly contaminated with organic matter, and at times a dangerous source of typhoid.

The chlorination of all water used in both the private houses and the plant removes the possibility of infection from this source.

Fire Protection

For the protection of plant and community from a fire, a fire department has been organized with hydrants located at proper distances apart. Two volunteer fire companies have been organized and are provided with a hose reel



THE FIRE BRIGADE.



FOR THE UNMARRIED EMPLOYEES WHO WISH TO AVAIL THEMSELVES OF ITS ADVANTAGES, THE COMPANY OPERATE THE BALTIMORE HOUSE.

and a chemical wagon, housed in an attractive station. Fire alarm boxes of the break glass type are located on the ornamental lamp posts. These boxes serve to operate an indicator in the fire hall, and also operate an electric syren at the plant. This signal gives the operator at the pump house notice to boost the pressure.

Plan Arrangement of Houses

As will be seen from the accompanying illustration, the single house has three rooms on the lower floor with a back porch. The dining room is 10 ft. 8 in. square and opens onto the living room of larger size. A swing door connects with the kitchen, which is provided with a sink and pantry closet. A rear entrance leads to the outside and also to the basement, the cellar stairs being located under the stairs leading to the second floor.

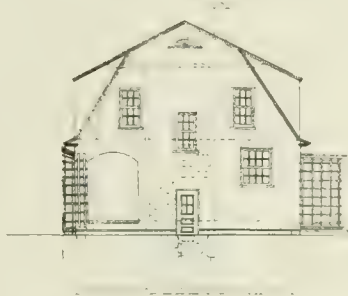
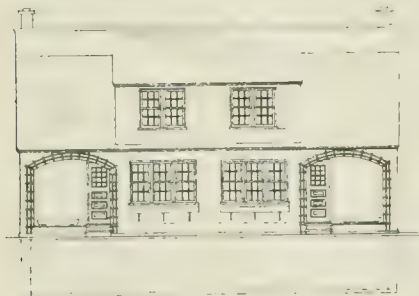
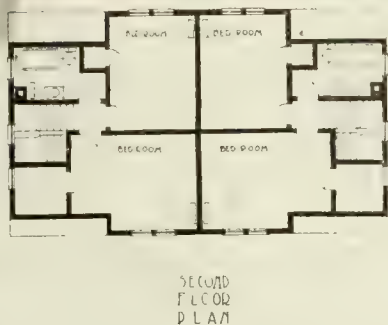
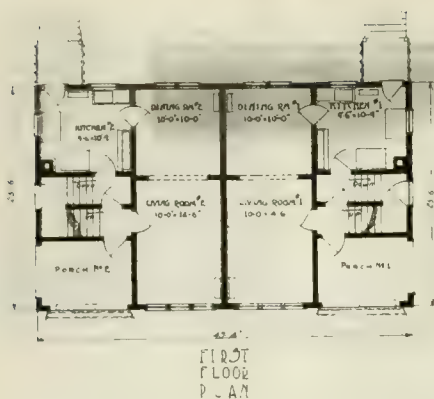
The second floor contains three good-sized bedrooms and bath, closet space being provided for each room.

The double houses are arranged on a slightly different plan, the stairs leading to the second floor from a small hall, instead of directly through the liv-

ing room. A front porch is also provided, instead of one off the living room. The kitchen is directly off the hall and opens into the dining room through a swing door. The bedrooms upstairs are only two in number, but are of generous size.

The double house admits of slight variation in plan, several different arrangements being used. All the houses are heated by hot air, and all are provided with conveniences and electric light. Their popularity with the working staff is such that there is a waiting list for houses, which from time to time are vacated.

In order to make provision for those employees who are unmarried the company found it necessary to take over the old Baltimore house in Chippewa, a frame building which has existed for a good many years, for almost a century in fact. The interior of this building was completely remodelled, a new veranda built and other alterations made, which resulted in a very comfortable home for employees who wished to take advantage of it.



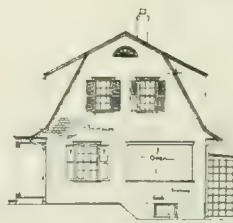
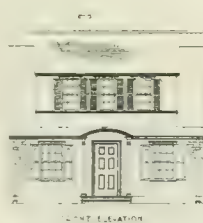
PLAN AND ELEVATIONS OF TYPICAL DOUBLE HOUSE.

First Aid Not Neglected

As may be seen from the illustration of the first aid room shown, this phase of plant management was not neglected. The equipment shown and the room in which it has been installed might well do credit to many a hospital. A cot has been provided, and an operating or first aid table is shown. Sterilizing apparatus and an instrument table will be noticed in the illustration, together with other apparatus of like nature.

THE "HEAT UNIT BASIS"

In large plants, where the consumption of fuel is heavy, it pays to buy on what is called a "heat-unit basis," because in this way the consumer gets exactly what he pays for, in all cases. In applying this method, an estimate is first made of the number of pounds of water that will



PLAN AND ELEVATIONS OF TYPICAL SINGLE HOUSE.



VIEW SHOWING TYPICAL HOUSES, NORTON DEVELOPMENT, CHIPPEWA.

probably be evaporated by one pound of coal, under standard specified conditions, and a nominal or basic price is then agreed upon, as representing the value of the coal in case it should yield the exact amount of heat that has been assumed. Tests of the coal that is actually delivered are then made from time to time, and the basic price is corrected in conformity with the results that are obtained—the dealer receiving a proportionately greater price if the heat production exceeds the estimated value, while the buyer receives a corresponding rebate if it falls short. In applying this method in practice, a sample shovel-ful is retained from each load of the coal, and all these samples are thrown into a suitable receptacle, where they are kept, protected from the air and the weather, until some definite and predetermined quantity has accumulated, or until one entire shipment of the coal has been delivered. The individual samples that have been saved out are then thoroughly mixed, and a smaller sample is withdrawn from the whole and sent to the chemist for testing.



WELDING AND CUTTING



The Development of Oxy-Acetylene Welding—II

Some Interesting Facts Presented Before the Institution of Mechanical Engineers by the Author—Historical Development and Data Regarding Present-Day Applications

By HENRY CAVE, Hartford, Conn.

Fig. 2, plate 1, illustrates a machine called the "Duograph" designed for the welding of the longitudinal seams in barrels and other metal containers. The barrels are welded while in cylindrical form, then the bilge is formed by various methods of rolling, expanding by hydraulic pressure, or in another style two beads are rolled out which answer the same purpose. It will be realized that the weld to stand this abuse and produce a reliable article for a shipping container must have strength and ductility approximating the original metal. This can only be obtained by a special feature of this machine, the use of two torches, one flame on each side of the metal being welded, and one torch travelling slightly ahead of the other. In this way welds are produced, which under tension tests cause the metal to

break outside the weld, and yet have sufficient ductility to stand the extreme distortion in forming the bilge.

few years, and there is a very large amount of tubing used for the construction of bedsteads, baby carriages,

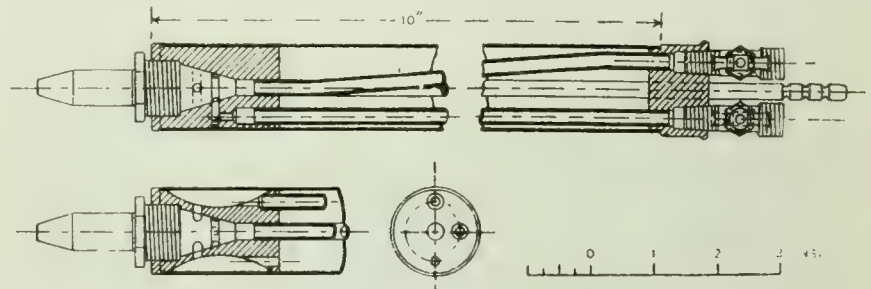


FIG. 3 WELDING TORCH. WATER-COOLED

The development of the use of mechanical welding for the manufacture of tube has been very extensive in the last

and in various parts of the cheaper grade of automobiles being manufactured in this way. The cost, of course, is very much lower than for the solid-drawn product, and when the welded tube is redrawn there is very little difference in appearance or accuracy. The abuse that a welded tube will stand when made in satisfactory manner is remarkable. Specimens have been squeezed up under a press without the welded seam opening up in any way, and even after this treatment it is difficult to determine the location of the weld. The grooved tubing used for automobile wind-shield frames is very extensively manufactured in this way. One of the developments which has helped the production of articles of this nature is the use of multiple jet-tips. Such tips are made with as many as six flames, and these weld very much more rapidly than with a single jet, less heat being dissipated sideways into the body of the metal than with the equivalent single flame. Welds have been produced with these tips at the rate of eight feet per minute, without preheating.

However, it has been found necessary, on this class of work, to use a water-cooled torch, fig. 3. The water circulates completely through the torch head and down close to the point of tip, fig. 4, on one side, passing up the other, and

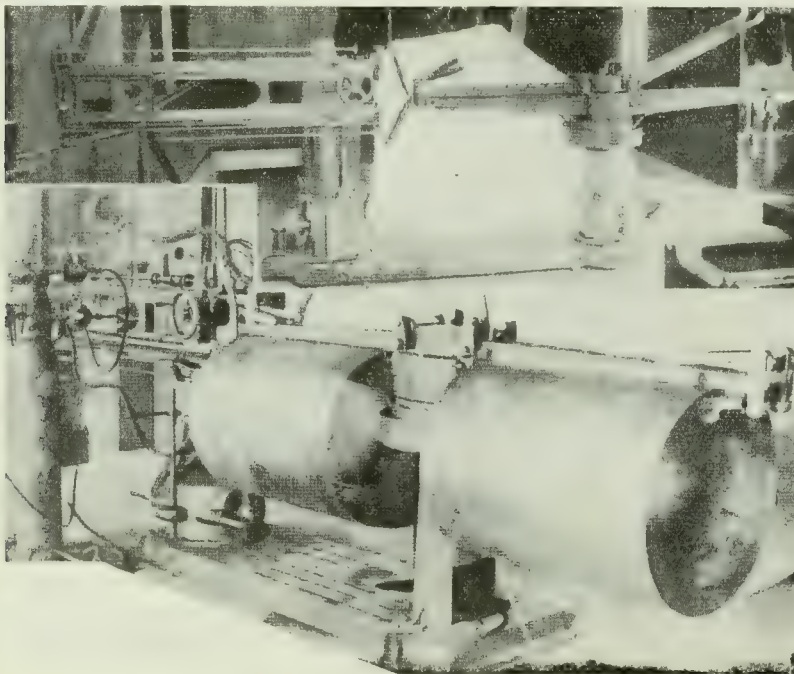


FIG. 2 TWO VIEWS OF THE DUOGRAPH

conveyed to and from the torch by small rubber hose. The use of this system of water-cooling is not due to any fear of burning the tip, but to a change of the gas mixture, caused by the variation in the temperature of the torch head. Such a change would affect the flow of the gases, thus producing variation in the amount of heat applied to the metal, and which in turn would give irregular conditions and require constant watching by a skilled welder, who would from time to time have to change the gas mixture or vary the rate of speed of the material passing under the flame to compensate for such variations. Even with the best possible operator, the results would not be in any way comparable with that produced by a water-cooled torch with a comparatively unskilled machine tender. The size of the flame and the speed of traverse would, of course, be determined by an expert and standardized for the various thickness and conditions of material.

The use of the welding torch operated by hand has attained tremendous proportions in connection with repair work, particularly on broken parts of automobiles, and in connection with the repair of breakages of the higher grades of cars, spare parts for which are comparatively expensive. For a time the welding of automobile cylinders, cracked due to freezing in winter, was very extensively carried out. In the last two or three years, however, the knowledge of the requirements of an automobile in this direction has spread so generally as largely to eliminate trouble from this cause.

The welding of defective castings in the foundries has not developed to an extent that might be expected, mainly due to the difficulties encountered in connection with the expansion and contraction, and the hard metal resulting from the inferior welders that were frequently employed. To a very large extent the fact that foundries sell their castings, and their customers object to receive material that has been fixed over, mitigates against this use, and that small castings, which would produce the most fertile field for the process, are made at such a low labor cost (the labor being the only saving, as the iron can be used over again), the use of the process for this purpose is largely eliminated. The welding of small steel castings with oxy-acetylene is quite extensive. Not so, however, with heavy castings, as the cost of the process is so much in excess of that of the electric process, which was found to make welds good enough for a great variety of this work, where strength is not required.

The Use of Welding in the Manufacture of Small Articles

This has not developed to a large extent, owing to the high cost of labor in the United States, necessitating machine methods for cheap production, even at the sacrifice of some of the advantages of designs that might result from the use of hand methods such as oxy-acetylene welding.

Welding on Steam Boilers

This is practically limited to repair work, of which there is a considerable amount in marine boilers, but a comparatively small amount in land boilers, excepting possibly locomotives. Restrictions of some of the State authorities and by all of the insurance companies had advisedly kept down the amount of this work, and to some extent also the welding of pressure containers; otherwise, the large number of cheap equipments in the hands of unskilled operators employed by irresponsible concerns would have unquestionably resulted in numerous disasters due to poor work, and also due to work having been carried out in locations that would make it inadvisable. Certain operations, such as the welding of the fire-end of boiler-tubes to the tube-plate, are being carried out almost entirely by the electric method, as the large amount of heat put into the plate

remarkable results are being obtained in the speed of laying pipes by this method. At a recent demonstration of pipe welding before a convention of gas engineers, 4-inch I.D. pipe was welded in 3 minutes 20 seconds actual welding time, and at another demonstration, joints in 2-inch pipe were made at the average rate of 1½ minutes per joint. These results show the best possible practice, but unfortunately very much slower times are being made by a large number of welders, due partly to the failure of the concerns to realize the necessity of using skilled operators, and partly due to the scarcity of really skilled operators, and the large wages that they command in this country. Flanged or threaded connections are not reasonable at the valves in an otherwise welded pipe-line. The cast-iron valve casings usually used are very liable to break and cause trouble, and even loss of life, and cast-steel is expensive and unsatis-

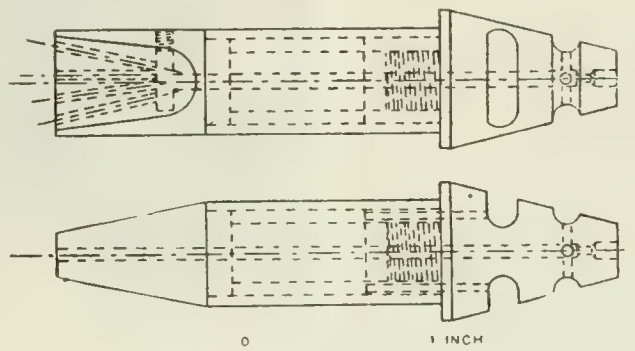


FIG. 4—MULTIPLE WELDING TIP, WATER-COOLED

by the slower oxy-acetylene process causes trouble.

Welding of Malleable Cast Iron

This is entirely carried out by the use of Tobin bronze rods, all other materials having proved unsatisfactory. The difference in color of this adding metal and the generally small value in malleable iron castings make it prohibitive for the repair of defective castings in the foundry.

Welding of Monel

Considerable study has been given to this natural alloy of copper and nickel, which presents unusual difficulties to satisfactory welding. One firm is now turning out Monel tubes formed up from sheet and then welded by this process.

Welding of Gas Mains

This has developed very rapidly within the last two or three years for high pressure service between townships. The welding of the large mains for the Panama Pacific Exposition, and the subsequent publicity, gave a great impetus to the use of the process for this purpose. At the present time, however, there is not much of this work being done, owing to the high price of pipe, and to the increase in price of metals resulting from the demands of the European war, making it undesirable at this time to carry out numerous extensions in gas mains, which otherwise would have been installed. Some

factory for welding. The valve is made up from standard pipe entirely by the oxy-acetylene process, both the cutting and the welding being carried out by this means; even the seat of the valve is welded, being made of Monel, which has been found to be the best metal for this purpose. The Monel is deposited on the end of the pipe and forms the valve-seat.

The war has caused a much greater advance in the application of the cutting torch than in that of welding; and among other developments the nicking of billets from which projectiles are made, enabling them to be subsequently broken up so that the fracture can be examined, is being carried out very extensively at the present time.

The Cutting of Risers

In the steel foundry has become very general, some foundries having almost eliminated the use of mechanical methods of cutting.

The Cutting up of Scrap Steel With Oxygen Due to the Higher Metal Value

Has developed very rapidly in the last two years. Prior to that time the cost of cutting was hardly warranted by the price that could be obtained for the scrap metal.

Armor-Plate Cutting

This is being done very extensively, hydrogen being generally used as a heating gas. Heavy cutting of this sort is

mostly carried out by a small machine called the "Radiograph," Fig. 5, Plate 1, which carries a motor, driving through a variable speed-gear two of the wheels, a third wheel being of castor type, so as to allow for steering. This device carries a cutting torch and can be steered over the plate which is to be cut by means of a small hand-wheel, or the machine can be used on the end of a trammel cutting a circle from a centre where the cutting is in a straight line. It can be used, as well, on guide-rails which are laid on the work, or the rails can be supported above the work in such a manner as to allow the cutting to be carried out. The torch can be swivelled in any direction so as to allow for a bevel to be cut. This device has been used for cutting port-holes in armour-plate, and a large amount of similar work, and has effected a remarkable saving.

Acetylene generators of the "water-to-carbide" type and made on the flooding principle, so commonly used in Europe, have never found favor in the United States, owing largely to the regulations of the Board of Fire Underwriters. The use of "carbide-to-water" generators is practically universal.

The terms "Low-pressure" and "High-pressure" systems do not mean the same in the United States as in Europe, where the names refer to whether the gas is taken from low pressure generators or from dissolved-acetylene tanks, the latter being, of course, called "high-pressure." In the United States the terms refer to the type of mixing device embodied in the torch, and not to the source of supply of gas. The type, in which the oxygen under a considerable pressure draws in, by injector action, the acetylene which is under only a few ounces pressure, comprises the "low-pressure" system. Sometimes torches of this description will be used with acetylene up to about 2 lb. pressure, the principle being practically the same as when only using a few inches of water pressure. Torches of this class can obtain their acetylene from a generator either of the "high-pressure" or "low-pressure" type, or from a dissolved-acetylene tank. The "high-pressure" type has the pressure of the oxygen and acetylene more nearly uniform, the acetylene being under sufficient pressure so as not to require the injector action of the oxygen to cause the mixture. The most popular type of torch has a mixing device in which the oxygen and acetylene are driven together at right angles by their own pressure in a detachable tip, thus producing the maximum vortex; this results in a very thorough mixture and a close approximation of the theoretical correct proportion of one part of oxygen to one part of acetylene required to produce the reaction to carbon monoxide, which is the only part of the flame used in welding; the balance of oxygen required to produce complete combustion is taken from the air. The acetylene in this case cannot be taken from a low-pressure generator. Either a high-pressure generator working up to 15 lb. per square inch or dis-

solved acetylene is used, and owing to the lower cost of the former method it is adopted wherever possible for stationary work. Dissolved-acetylene cylinders are used almost universally for portable requirements, portable acetylene generators being prohibited by the insurance authorities.

Lack of skilled operators has greatly retarded the development of the industry in the United States, because there is no systematic method of instruction as in France, Germany, and Great Britain. The larger firms selling apparatus give a small amount of instruction free. This is necessarily limited, however, merely to defining the fundamental principles, and instruction is given at a time when the student has not sufficient knowledge of the process readily to absorb

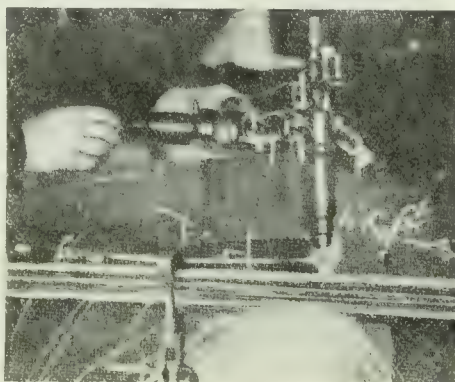


FIG. 5—THE RADIOGRAPH

it. The price charged for the apparatus does not warrant a large expenditure by the manufacturers for this free instruction.

Other operators are developed from helpers around the welding shops. The practice necessary to produce skilled welders must then necessarily be obtained on productive work, with the result that the general standard of work is lowered, and the industry suffers thereby. There is no doubt that the industry would expand by leaps and bounds if some system of producing skilled welders were developed; and it would be a great advantage if these welders could be also skilled in the various trades in connection with which they work, as there are big advantages for a boiler welder to be also a first-class boiler maker, a welder in connection with machine-shop work to be a machinist, and likewise in the other trades.

A PROBLEM IN LUBRICATION

By M. E.

Mr. W. B. Hardy, M.A. (secretary of the Royal Society), discussed the problem of lubrication in relation to colloids. Water, ether, alcohol, benzene, and strong ammonia were apparently entirely incapable of maintaining a lubricating film on glass. "Seizing" occurred just as readily when they were present as it did with cleaned surfaces. Glycerine differed from those fluids in

the fact that, though it would not maintain a lubricating film, it did prevent "seizing" when present in excess. For instance, the maximal tangential force which a pair of cleaned surfaces would support without slipping was measured in grammes 55. Flooding the surface with water, benzene, alcohol, etc., left that value unchanged. When a film of glycerine was deposited on the surface the force stood at 55, measured in grammes, but it fell as the quantity of glycerine present was increased to 9, when the surfaces were fully flooded. The expression "film" denoted a layer of fluid on the solid surface, so thin as to comprise probably only a single layer of molecules. With a true lubricant the facility for slipping was maximal when a layer of such excessive tenuity separated the solid faces and nothing was gained by increasing the thickness of the layer. Thus with castor oil the weight required just to start one face of glass slipping over another was 10 grammes, when only the invisible film of fluid mentioned above was present, and it was still 10 grammes when the surfaces were flooded with oil. Some fluids indeed seemed to lubricate better in thin than in thick layers; to act, that is to say, in the contrary way to glycerine. Acids as a class behaved in that way, the solid faces again being of glass. The pull in grammes was as follows:

	Film	Surface flooded
Acetic acid	40	47
Sulphuric acid	37	47
Oleic acid	10	13

If that result could be fully substantiated it would be an important and striking physical fact likely to throw much light upon the process of lubrication.

One broad conclusion emerged—namely that lubrication depended wholly upon the chemical constitution of a fluid, and the fact that the true lubricant was able to render slipping easy when a film of only about one molecule deep was present on the solid faces suggested that the true lubricant was always a fluid which was absorbed by the solid face. If that be so, then the problem of lubrication was merely a special problem of colloidal physics.

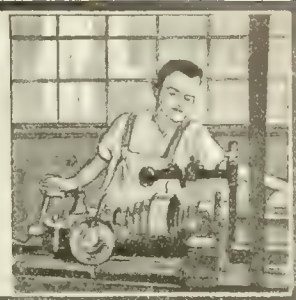
In a paper read at Toronto, A. V. White estimates the water power available on the St. Lawrence River at an average of 2,150,000 h.p.

* * *

A scheme originating in Germany for housing airships involved the digging of a huge circular trench in the earth and the covering of this trench by a movable roof in sections. Two airships could be stored side by side and the total number under cover would depend on the diameter of the circle. In this system the roof of the shed can be made to slide about the centre of the circle, so that it would be possible to send out any airship whose axis was pointing into the wind.



WHAT OUR READERS THINK AND DO



Views and Opinions Regarding Industrial Developments, Factory Administration and Allied Topics Relating to Engineering Activity

ETCHING AS A MACHINE SHOP OPERATION

By C. E. H.

THE etching process is one which deserves much greater attention than it seems to receive at present. Much time, temper and profanity might be saved by this simple but neglected process.

Take the case of a tight bolt or cap screw for instance, when the only available tap or die is worn or otherwise useless. By slightly heating the screw and immersing for a few seconds in about three parts water and one part nitric acid the screw will be uniformly reduced. Wash off all trace of acid and oil it to prevent rust, or better still neutralize in any alkaline solution and then oil it. If still too tight wash off oil (benzine or gasoline is best if available) and repeat the operation. A few trials will soon render "repeats" unnecessary.

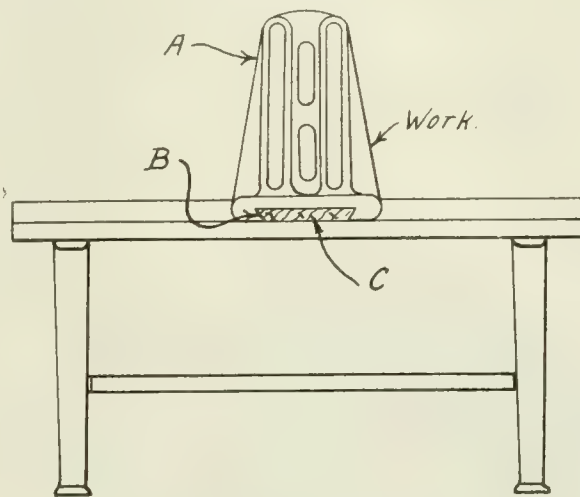
Again, etching comes in very useful in uniformly reducing uneven surfaces, as in the case of small embossing dies, (and this is where the writer uses it extensively); where fifteen minutes or so of the etching process will accomplish the same result, which would take several hours of hand work with gravers and chisels. Further, if certain parts are not to be reduced, they can be painted over with asphaltum varnish, care being taken to cover about 1-64 in. beyond the parts to be protected all round. This is to avoid undercutting by the acid and any small margin can be cleaned up afterwards. Place a little wall or dam of beeswax, or better still "Plasticene modelling clay," as it is very easily handled and very cheap, all round the part to be etched to retain a body of acid. Previously warm the article, as the hotter it is the quicker the re-action.

On multitudes of small jobs this simple process will suggest itself as a great time saver, and consequently a "cost cutter."

It is used extensively in the manufacturing jewelry business and should prove equally useful in the machine and other small shops of varying kinds.

A WORK HOLDING KINK FOR THE BENCH

The accompanying illustration shows a simple method for holding the work A



WORK HOLDING KINK FOR THE BENCH.

on a bench while it is painted. The part shown is an overarm brace and is used on a milling machine, this part is dovetailed at B and advantage is taken of this for holding it.

The illustration shows a block of wood C that is cut so it will fit the dovetail in the work. The work is pushed over this block of wood in the manner shown and is held thereby in the position illustrated while both sides are painted, this makes it unnecessary to turn the part over to paint it and prevents smearing the same.—G. H.

SELECTION AND CARE OF PAINT BRUSHES

By M. A.

Flat brushes of widths suitable for the various uses up to 5 or 6 in. wide are more generally used than other forms because a greater amount of surface can be covered at a stroke. With flat brushes, however, the paint cannot be rubbed out as well as with a suitable round brush. For painting sashes and other small surfaces small oval brushes with a chisel-shaped end are most satisfactory. Varnish brushes are also made chisel-shaped or slightly tapering instead of being spare on the end as this allows the varnish to be flowed on more evenly, which is essential. For whitewash or calcimine a very wide brush may be used since these are applied lightly to the surface and are not rubbed in.

Brushes for applying oil paints must be well cleaned after using, though for keeping overnight it is generally sufficient to wrap them in several thicknesses of paper. Some painters keep their brushes overnight by putting them in water. If, however the brush is not to be used for several days the paint should be washed out of it. Turpentine is one of the most satisfactory materials for washing a brush but it is expensive and a brush can generally be washed as well with kerosene, which is much cheaper. After washing off the paint with kerosene the brush should be rinsed with petrol or benzine, then thoroughly shaken, and well washed with soap and warm water. As soon as this washing is complete the brush should be shaken thoroughly, so as to throw as much water out of it as possible, and hung up to dry with the bristles down; when dried the brush should be thoroughly protected from dust.

If much painting is being done, it is less trouble to keep the brushes in turpentine or kerosene. For this purpose hooks should be fastened on the inside of a pail with a close fitting cover, and the brushes should be suspended either by holes in the handles or by loops of string so that the ends hang in kerosene or turpentine in the bottom of the pail. If kerosene is used for cleansing it should be removed by shaking the brush and rinsing it in turpentine before using again with paint.

Brushes used with whitewash or cal-

cinime should simply be washed and not put in the same liquids in which the brushes used for oil paints are kept. If a brush has been used for shellac varnish, it should be kept in alcohol or in the varnish itself. In general, a varnish brush may be kept in the varnish in which it is used.

A SPRING WINDING TOOL

Spring winding, which sometimes is a very irksome job, can be made easy if the device illustrated is used.

In form it is similar to the regular toolholder, fitting the lathe tool post. The hole A can be any size reasonably near that of the spring wire which it is

job without the proper tool or how the boss in their shop discovered a new, quicker way of doing a time-honored piece of work. And these mechanics are just as bad as so many women—they can't wait for one to finish to get in another experience equally as good or better—if nothing prevented, they could and would talk a whole day without exhausting the subject.

These are the experiences the editor wants. Write them just as you would tell them—the editors will smooth off the rough edges and put on the polish if needed. The very methods and tools which may be common property of the shops in your vicinity may be unknown elsewhere and local pride, if nothing

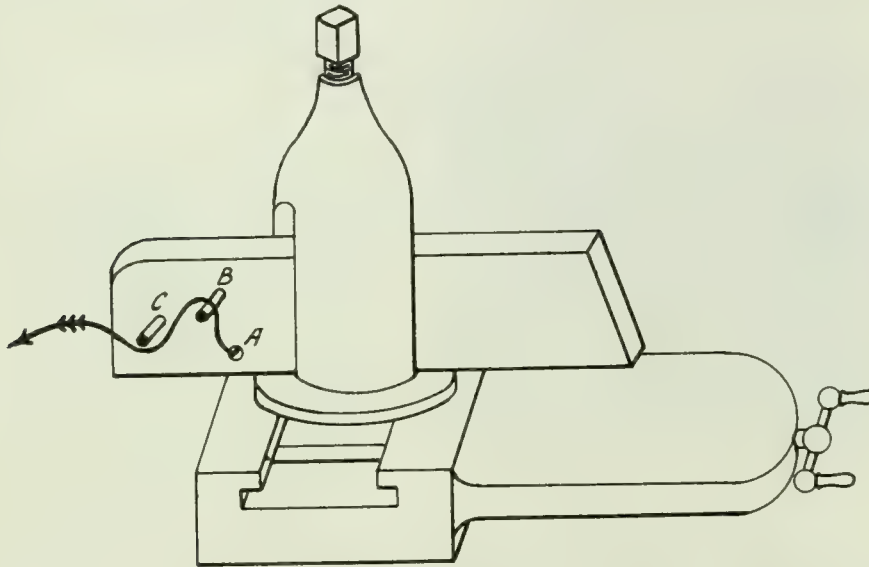
remain the same for long, long years, and will bear repeating at intervals, for all technical papers strive to educate the newcomers as well as the older men. These basic operations are subject to new and ingenious applications with the modern advances in the art. All of these things can be worked into articles that the editor is glad to receive.

Two of us as apprentices subscribed to this paper. We found a world of information in it to discuss and compare—I'm afraid often on the shop's time, but then we were pushers and ready to try anything new or quicker for the shop. Sometimes we had a job to do that seemed as good as those we read about and naturally one of us remarked, "Let's send it to CANADIAN MACHINERY." That got to be a joke, but finally I took a picture of a planer job that turned out well and wrote a couple of hundred words about it and sent it to the editors without saying anything around the shop. When that appeared in print and I showed the cheque for four dollars that went with it, the idea ceased to be a joke any longer. Following that first successful instance, there was a long list of rejected "articles" and a few money orders for fifty cents, but the editors were courteous and the rejections only served to spur on to better efforts—to be frankly critical of one's own work is the first step toward success.

And it pays the author in every way. The Buick Six that serves as a splendid refresher after a long day inside could be bought with the money received from writing and its maintenance and that of the cars I have owned before more than covered by the same source. And then there is the self-improvement side of writing—"writing makes a ready man," and as he writes he is sure to stumble on points of doubt upon which he must read up before he turns out the completed article. Often a single point entails many evenings of study, to the ultimate good of the student. Then anything that is written fixes itself much more firmly in the mind than what is simply read. All of these things help the writer as much or more than the ones who read them and have a distinct broadening effect. Added to the foregoing is the fact that some one is waiting for what you write—glad to read it, and some one else is ready to pay for it at substantial rates.

BURNING ASHES

There is always more or less unconsumed coal in the ashes that are removed from the boiler, and this coal, if it were separated from the ashes with which it is mixed, would be available for further use as fuel. Except for this slight proportion of coal that has slipped through the grates, ashes are entirely incombustible. They are what is left, after everything has burned that will burn. The compounds that are placed upon the market and which, when mingled with ashes, are supposed to make them suitable for fuel for the further production of steam, are absolutely without value.



SPRING WINDING TOOL

purposed to wind. As a matter of fact the one holder will take several sizes of wire.

The wire comes through the hole in the direction of the arrow, over the pin B, and under the pin C, and then around the arbor, which is between the lathe centres. As may be seen, all that remains to do is to engage the half nuts, as in thread cutting, and the rest is easy.—Wm. Earnest.

HOW I BROKE INTO PRINT

By D. A. HAMPSON

Under that none-too-elegant title we would expect to find a ten cent "work" for the instruction of budding authors, shelved beside the other "how" books in our news stands and book stores. So far as trade and business paper writing is concerned, there is no "how" to it at all—it is simply a case of Do and Do Again.

In CANADIAN MACHINERY we see appeal after appeal to the men on the firing line to open up and share the interesting experiences and the trade kinks that they have met with in their work. Whenever two or three mechanics get together one of the subjects of conversation is how they did this difficult

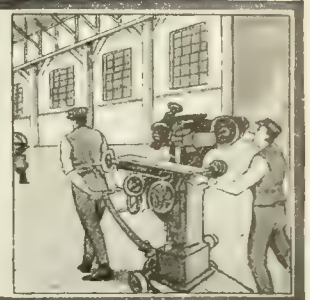
more, should want to put that vicinity on the map and bring it that much credit for mechanical initiative. Over and over again some acquaintance has told me of reading something of mine in a certain paper; invariably my reply has been, "Yes, but, Will you have been so much farther than I and have had such varied experiences that you should have material for a year's writing, all of it being more valuable than mine."

Those people who have such goods to sell—and it's a selling proposition—rarely get down to the point of actually trying, or if they do try once and get turned down by an editor, they become disgusted, like the Grouch that complained in a recent issue. Why, one of the standing jokes in our household was for me to be met at the door with, "You've got another R. M.," R. M. standing for returned manuscript, a highbrow name for what was often but half a sheet of paper.

There are articles that lack merit and subjects that are hackneyed, but anyone who reads the paper he expects to contribute to can select an experience or two which steer clear of these dead lines. And then the old matter has to be brought up ever so often for the benefit of the younger generations in the trade. Basic principles and operations



DEVELOPMENTS IN SHOP EQUIPMENT



Makers of equipment and devices for use in machine shop and metal working plants should submit descriptions and illustrations to Editorial Department for review in this section.

"SUPREME" QUICK-ACTION VISE

THE Spafford Tool Works of Hartford, Conn., have recently placed on the market a new quick-acting vise for general machine shop use, though it is particularly adapted for hand and power milling machines, grinders, and machines on which vises or fixtures are used.

The vises are made in four sizes, namely 3 in., 4 in., 5 in., and 7 in.

The steel parts are made from drop forgings and bar stock to gauges, hardened and ground, and the base is scraped to fit the slide.

The jaws are drilled to gauges to permit of the loose jaws being transferred from one vise to another.

The stationary jaw is let into a recess in the semisteel base to prevent it from changing position, as it might do if simply doweled on top of the base.

The bolt holes for clamping the loose jaw to the stationary jaw are located so that it is convenient to tighten them without coming in contact with the bumper block.

The pin which the cam lever works against in opening the vise is so located that when the vise is fully opened the lever slips past the pin, thus avoiding breaking the pin, or elongating the slot in the semisteel base.

The hardened slide is smooth on top without any serrations for the dirt to

The sliding jaw is operated by means of a cam lever which draws it tight against the work, while the eccentric lever gives it a final tightening, thus holding the work securely.

pump being provided with a priming chamber and having both intake and outlet located at the top, which makes it impossible for the pumps to lose their prime. The impellers are of the semi-



NEW FULFLO PUMPING UNIT

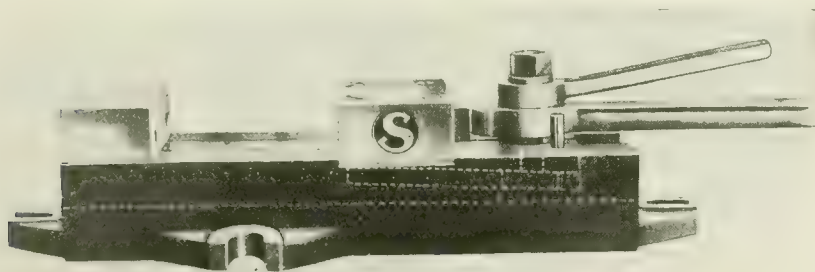
A NEW FULFLO PUMP

The Fulflo Pump Company, Blanchester, Ohio, has placed on the market a line of direct connected motor driven pumps. These pumps are designed for

enclosed type, and are supported by a bearing at either end of the impellor shaft. The thrust is on the suction side of the impellor and is taken care of by a hardened steel thrust collar on the impellor shaft which thrusts against the nose of the bronze bush supporting the impellor shaft on the suction side of the pump. The thrust at this point is very slight as most of it is taken up by the coupling between the pump shaft and the motor shaft.

The main pump bearing also forms the pump gland and is of cast iron. The lubrication of this bearing is taken care of by a sight feed oiler which feeds into a pocket completely surrounding the bearing.

The shaft is of hardened and ground steel. The packing used is the flexible metallic type and is guaranteed not to cut the shaft. The life of this pump is exceptionally long as the impellor, the only internal pumping part, does not depend on any contact fits for its pumping efficiency. Standard pumps have cast iron bodies, covers and impellers, but may be furnished in brass or bronze when so desired.



QUICK ACTION VISE

get into and wear off, the levers being firmly held in place by means of a bolt in a T slot, the underside of which is on an angle, also the bolt head to correspond, thus giving it a wedge shape, which makes it impossible for the bolt to slip back.

use in connection with high-class motor driven machine tools, oil circulating baths and for supplying batteries of machines with cutting oils or compound.

They are all centrifugal in type, but retain their prime without the aid of valves or other mechanical means, each

The base is arranged for three point mounting, which enables it to be leveled without the necessity of machining the surface to which it is to be attached. The pump is attached to the base by six screws, three of which extend through the motor and pump base and three of which extend through the motor base only, the pump base resting on their points. This makes it possible, by the adjusting of the screws, to bring the pump exactly in line with the motor, after which the screws are locked in place.

The coupling used is the "Flexite" type, manufactured by F. R. Blair & Co., and it is fastened to both pump and motor shaft with Woodruff keys and set screws. Robbins & Meyers motors are regularly furnished.

The outfits are furnished in four sizes:

$\frac{3}{8}$ in. pump with 1-6 h.p. motor, maximum rating of five gallons per minute, 18 in. suction without using valve and 15 ft. head lift.

$\frac{1}{2}$ in. pump with 1-3 h.p. motor, maximum rating of 18 gallons per minute,



THIS MACHINISTS' OILER MADE IN $\frac{1}{2}$ AND $\frac{3}{4}$ PINT WITH $5\frac{1}{2}$ IN. AND $9\frac{1}{2}$ IN. SPOUTS $3\frac{1}{4}$ IN. BASE

12 in. suction without valve and 20 ft. head lift.

1 in. pump with $\frac{3}{4}$ in. h.p. motor, maximum rating of 27 $\frac{1}{2}$ gallons per minute, 18 in. suction without valve and 40 ft. head lift.

$1\frac{1}{4}$ in. pump with 1 h.p. motor, maximum rating of 40 gallons per minute, 18 in. suction without valve and 40 ft. head lift.

These pumps can be furnished arranged for either wall or floor mounting.

The pump shown in the enclosed photograph is $\frac{3}{4}$ in. size equipped with 1-3 horse power motor running 2,700 revolutions per minute, overall dimensions are as follows:

Length, 19 $\frac{3}{4}$ in.; width, 8 in.; height, 9 $\frac{1}{4}$ in.; weight complete, 58 lbs.

Tests on twelve of these pumps showed the following average result:

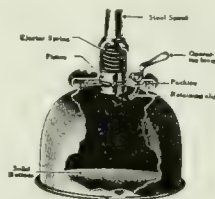
Speed, 2,700 r.p.m., 21 gallons per minute, 11 ft. head; speed 2,700 r.p.m., 20 gallons per minute, 12 $\frac{1}{2}$ ft. head; speed, 2,700 r.p.m., 11 gallons per minute, 24 ft. head.

Cutting compound was used in making these tests.

These pumps will be furnished with motors of varying speeds and sizes to meet varying conditions.

FORCE FEED OIL CAN

The accompanying illustrations show a new oil can developed by Gustave Lidsen, Desplaines street, Chicago. The mechanism controlling the feeding of



INTERIOR VIEW SHOWING SIMPLICITY IN CONSTRUCTION

oil is all in the spout and its arrangement is such that it will entirely empty the can. The oil can spout is self cleaning, and is easy to operate. The drawn steel body and heavy welded spout make the can leakproof. The spout is held on the can body by means of curved flanges



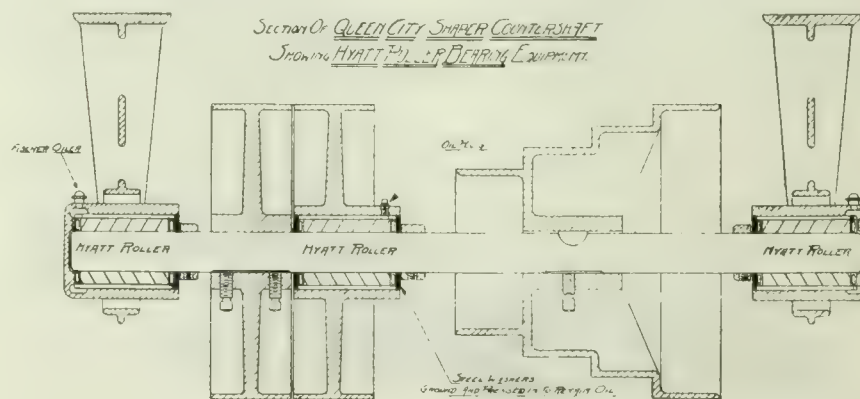
SHOWING WIDE OPENING FOR FILLING ALSO CURVED FLANGES AND LOCKING MEMBERS WHICH MAKES IT LEAK AND WEAR PROOF AT THIS CONNECTION.

with a packing ring held in the spout flange.

The can has a large opening and is therefore easy to fill and having a positive force feed is self cleansing and requires no spring bottom.

NEW SHAPER COUNTERSHAFT

The Queen City Machine Tool Co., Cincinnati, Ohio, announce that on all shaping machines manufactured after March 1st, countershafts will be fully



SECTION THROUGH COUNTERSHAFT ASSEMBLY

equipped with Hyatt Roller Bearings as shown in the accompanying illustration. As may be seen the installation is simple and efficient. This is the latest of a series of improvements mapped out by this company in an endeavor to make their shaping machine most efficient for peace time reconstruction.

This refinement brings the countershaft up to the same efficiency as the shaper for which it is intended.

SCALE

Boiler scale is very common, and more or less of it is quite sure to be formed unless the water is unusually soft and pure. It varies greatly in composition, but its chief constituents are usually sulphate of lime, carbonate of lime, and carbonate of magnesia. Chloride of magnesia and sulphate of magnesia also occur more or less frequently, and these are particularly objectionable because they are corrosive and tend to attack the metal of the boiler. The physical constitution of the scale varies greatly, and two samples of similar chemical composition will sometimes differ a great deal in hardness and porosity. Sulphate of lime usually makes a hard, stony scale when it is present alone, or when it is the chief constituent. Carbonate of lime, under ordinary conditions, forms a soft scale in horizontal tubular boilers, though it often takes a hard form in heaters and in water-tube boilers. It is rare to find a scale composed of any one substance alone, however. Various substances are usually present in it, mixed in varying proportions, and combined also with sand, clay, iron-rust, and other sedimentary deposits. Boiler scale tends to deposit wherever the circulation in the boiler is sluggish, and where the heat is greatest and the evaporation most rapid. Scale that is formed in the upper parts of the boiler also becomes dislodged from time to time, falling down upon the lower parts, where, if not removed at proper intervals, it is likely to become cemented together in a compact mass, which not only diminishes the efficiency of the boiler, but also causes it, in many cases, to become badly damaged by overheating.

The Ohio Electric and Controller Co., Cleveland, Ohio, have published a new catalogue on their mill type lifting magnet. This publication is descriptive of the magnet in detail, and shows some very interesting applications of the magnet to actual work around the foundry and other industrial plants.

What Does Your Employment Office Look For

The Man Who Has Looked For a Job so Many Times That He is in the Professional Class, is Very Apt to Fool Even the Most Capable Employment Agent

By A. J. SCHNEIDER, Employment Manager of the Cincinnati Planer Co.

EMPLOYMENT managers will find much of interest in the following paper. It was prepared and presented by A. J. Schneider to the last meeting of the Cincinnati Employment Managers' Association. Mr. Schneider is the employment manager of the Cincinnati Planer Co., and has had plenty of opportunity to make observations on a large scale.—EDITOR.

1. Job analysis is the act of studying the requirements of a given occupation so that the best applicant is placed at the right work and it is necessary that the function of the employment department may be placed upon a scientific basis.

2. In my opinion the study of job analysis and specifications is one of the most important functions of the employment department. Although employment departments and executives generally will agree with this statement, I have seen very little of this work actually done right.

3. The best work along this line that I know of is that which is being done by the Westinghouse Co., of Pittsburgh, as explained by an executive of that company at the employment managers' meeting in Rochester about 14 months ago. They have made a study of occupations, operations and pay rates in order to standardize them. In other words, as far as job analysis is concerned, they made up a standard list of occupations with complete detail written requirements of each occupation. A copy of these was placed with each department to educate and have a common understanding throughout the plant.

4. Such work as this cannot be done by the employment department without the co-operation of the management and department heads. In other words, before you can make this go, the boss must believe in it, take an interest in it, and have great faith and patience in the employment department. This work is the same as other employment work in that it is necessary for the employment department to sell the idea, and educate and train the management and department heads. This is sometimes the hardest part of the work. In a first-class, well-managed organization, we will not have so much trouble along this line.

5. I think the first step in job analysis is the application blank. In a machine shop where we may have from 25 to 100 standard occupations, it can be seen that if we have just one application card that this would naturally take care of job analysis only in a general way. In my work I try to get general information which is required for about 90 per cent. of the occupations on the application form. After getting this information, I believe it is my duty to give the applicant the necessary information. To do this, I must have a good understanding of the job requirements. A written scientific study of the job or occupation would help me immensely without a doubt. It is really necessary but our company has not reached that point.

6. I make it my business to have this information and understanding in mind, at least, if not on paper. This comes through experience, co-operation and study. I have worked in machine shops all my life and when I interview a planer operator or vise hand, I know just about

what is required. I do not claim that I am absolutely sure that I have hired a first-class planer operator, but after having a good talk with him and possibly taking him to the department and having a talk with the foreman, we are not very likely to make a mistake as far as the hiring is concerned.

7. We have job analysis because we want to buy something. What do we want to buy? We want to buy service. We must know what service we expect or we had better not buy until we do know. It is the same as buying anything. If we buy a house, we must first know what kind of a house we want. How many and what kind of rooms, closets, how about the heating, location, surroundings, victory garden, water, etc.

8. I try always to remember that the type of applicant generally known as a floater is sometimes foxy, a nervy talker, and, having had lots of experience at hunting a job, may know better how to get one than the worker known as a sticker who makes very few changes, and is likely to be nervous or backward.

9. We once had an applicant who told me that this was the first time in 27 years that he had to look for a job and he didn't know what to say or how to go about it. This man, being a pretty square fellow, I decided right then and there that I would either hire him myself or get a job for him. The fellow who is a talker and has the right personality may sometimes fool you. Also the fellow who is a poor talker (or we might say poor salesman) may be just the right man for you. Most applicants whom I have interviewed might be termed as clumsy at getting a job. This seems to be the case and probably always will be, because the applicant has not the experience or study at getting a job that the employment manager has at hiring. Do not make this comparison as the applicant's specialty is the work he does, not getting a job, and yours is to hire him. Talk to your applicant on the level, don't look down on him, and don't look up at him. You and he are both imperfect.

10. In order to have a complete job analysis it is necessary to have a medical department and require the applicant to pass a physical examination in accordance with the requirements of the occupation. This, I think, is a very good thing and necessary that employees will be properly placed. If you don't want a man with flat feet to work for you as a trucker running around the shop all day, how are you going to avoid this condition without a physical examination?

11. In many occupations it is necessary to have a job analysis so that the efficiency and pay may be properly determined. Where job analysis is not studied, the rates of pay will be out of proportion, causing dissatisfaction and inefficiency. A good standard wage and salary schedule is impossible without the job analysis.

Nat Goodwin's will shows that he left about \$6,000. He made a lot of money, but he had a lot of wives. The wonder is that he had a single red cent left after his half dozen wedding trips.

Some folks made quite a lot of money out of the war. But some of them know how to get it even with no war on. For instance, a chap went into a Detroit bank a few days ago, whacked the cashier on the head and made off with \$10,000.

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Must Get After Business

SHORTLY after the signing of the armistice Canada sent a deputation to Europe to look for business. There had been much talk of reconstruction, and the idea seemed to be prevalent that this country could and would get a large share of that business.

Here is the situation, in words of official reports:

"The Canadian mission in London, in a communication to the Canadian Trade Commission in Ottawa, reiterates the impossibility of their carrying out actual agency work for individual Canadian firms. 'We think it a wise policy,' the communication states, 'to impress upon Canadian manufacturers that they must not depend upon us to make actual sales on their behalf. In every case where they are prepared to cultivate export business with Great Britain or other European countries, manufacturers should either send their own representative to this market, or appoint a reliable firm or agency on the spot to represent them.'

"The Canadian mission, however, will be glad to receive catalogues and other facts which would enable them to give information about Canadian goods in reply to the enquiries they are receiving in growing numbers."

Several Canadian firms have received practically the same word from the trade commissioners. It is apparent that business will go to those firms that go after it. There must be a large volume of business moving, but there are also a large number of countries in pretty good shape to attend to it.

Large concerns can send their own men overseas looking for trade, and smaller ones can probably work to advantage in groups. The point is: Don't sit back and wait for foreign business to come up and rattle the door of your establishment. In the present keen competition for business the orders are not walking around or tearing the hinges off your premises.

The Government's Department of Trade and Commerce has never been famous for the assistance it has extended to Canadian firms looking for business. The best policy is to become as self-reliant as possible. Put up your own props, and they are apt to stay.

A Tribute From His Partner

IN a recent issue of the Montreal "Gazette" appears an appreciation of the late George E. Drummond, of the firm of Drummond-McCall. It is signed by "J. T. McC.," the other member of the firm, who had been intimately associated with the deceased. In part the article says:—

"In the death of Mr. George E. Drummond in London, on the 17th inst., there has passed away the last of a remarkable family of four brothers, all well known in

Montreal, and all famous for their connection with public and business interests in this city and throughout Canada.

Mr. Drummond was well known in connection with the development of iron and steel manufacturing in Canada. He went into this business with the utmost enthusiasm, feeling that he was helping in developing one of the most important industries of the country, and his strong, persistent determination carried him over difficulties that would have daunted most of us. If there was an industry that required judicious Government assistance, it was the manufacture of iron from the ore, and the attitude of the successive Governments at Ottawa towards this matter was vacillating and inconsistent. What might be called the secondary stages, such as the rolling of iron and steel bars, the manufacture of nails, steam and water pipe, etc., were abundantly protected and consequently flourished. These trades were allowed to import their raw material free, or at a nominal rate of duty, but the premier industry, the smelting of iron from native or American ores, latterly received altogether inadequate protection. The returns from this industry were, therefore, up to the year 1914, altogether incommensurate with the enormous capital outlay required. This state of affairs could not continue indefinitely, and in the early part of 1914 the position of the iron smelting business in Canada was far from profitable, and indeed, altogether unsatisfactory. These conditions, however, were completely changed in the latter part of that year, and it is no secret that the iron business owes its present flourishing position almost entirely to the impetus it has received from the enormous demand and consequent high prices caused by the needs of the war. But Mr. Drummond was out of iron manufacturing before then, and did not share in the success that has attended this department of the business during the last four years.

"The picture of Mr. Drummond left in my mind is that of a man of strong, lovable nature, who endeavored in all his dealings with his fellowmen to 'play the game.' It is such men, whether they are personally successful or not, who build up a new country like this, and his influence will be felt long after he has passed away."

Buying Second Hand Equipment

ACCORDING to an item in the Humboldt (Sask.) "Journal" of recent date a new boiler is needed for the town plant, and the engineer in charge of the plant also recommends that a condenser should be added to the equipment.

In fact, the situation is that the plant will soon have to be shut down for repairs unless a new boiler is added.

The town council has heard the situation outlined, and has been informed that a condenser should increase the efficiency of the plant some twenty-five per cent.

Prices have been secured on new boilers that run from \$2,650 up, and a condenser, it is said, would cost around \$4,000. Of course, there are variations from these figures.

But the council has wind of an outfit that can be secured in Saskatoon for much less money. The boiler is said to be on the market for \$500, while the condenser is to be had for \$800. And so it is that the heart of the town goes out to the Saskatoon outfit.

Of course, there would be an immediate saving. Between the figures quoted for new and used outfit there is a spread of \$5,350. But what of it? It may be that the Saskatoon outfit is a regular bargain, in good shape, and put on the market under exceptional circumstances. If so, then the town stands to gain.

But why should a place of any size go into the market for second-hand equipment for a municipal power plant? Buying a second-hand boiler and a second-hand condenser is, as a general thing, doubtful policy. That states the case mildly. If the tubing has defects which come to the surface after put in use again, the difference in price can soon be absorbed in the re-tubing of the equipment.

Humboldt would be much better advised to send their specifications directly to a list of responsible firms in

Canada, and ask for quotations on a new outfit of lines that are known to be good.

Councils often make mistakes of this sort. They imagine that a boiler is a boiler, and a condenser is a condenser. The fact that the thing has boiled before or condensed before is not taken into consideration.

The belief grows with men who have an expert knowledge of such affairs that it is good policy and good financing to go into the machinery or power transmission market with a requisition for new material that carries with it the backing and guarantee of the people who make it.

Steel Ships Now Needed

THE craze and need for building wooden vessels has gone. It is well that there should be a fair understanding of the reason for their construction. They were born of necessity. Tonnage was required quickly, and there was not enough plate mill capacity in the Allied world to supply it. And so it was that wooden vessels were put on the ways in the yards.

The *Toronto Mail and Empire* refers to the matter as follows:—

"In view of the pressure on the Dominion Government to give contracts for wooden ships, as part of the national merchant marine, the experience of the United States Shipping Board is worth noting. Against the advice of General Goethals, and other technical experts, the Board yielded in 1917 and 1918 to the clamor for wooden ships, and ordered hundreds of them. Up to October 31 last, 84 had been delivered, 227 hulls had been launched, and 469 had been contracted for. Then suddenly the project suffered a collapse. So far, not one of the wooden ships has crossed the Atlantic. Two lying in New York harbor are reported to be unfit for sea. About a million dollars has been paid for repairs on wooden ships used in trade with Honolulu. Underwriters refuse to insure them and Chairman Hurley, of the Shipping Board, threatens to organize a Government Marine Insurance Board. The underwriters point out that in many of the ships the long keel beams are merely spiked together, the rudders are frequently put on in a very faulty way, some of the engine beds are shaky, and green timber used is con-

stantly warping. The Shipping Board has spent fully \$400,000,000 on them, and now is seeking bids and charters for them without result. The whole wooden ship programme has been a fiasco, so far as trans-oceanic service is concerned. Canadian yards turned out a number of wooden ships for British account, the orders being placed through the Imperial Munitions Board, and nothing has been heard respecting the utility of these. But now that steel ships can be obtained in plenty, the wooden ship freighter is again obsolete. It is fortunate for Canada that the national shipbuilding programme was decided on after the wooden ship fever had abated."

Can This Country Meet British Competition?

IN another part of this issue will be found a table of comparative cost of labor in England, Montreal, Port Arthur and the Pacific coast. These figures are illuminating and show what the Canadian shipbuilder will have to try and meet if he wants to build ships for private owners when the present Government contracts are finished. Taking the whole of the trades connected with shipbuilding, the average increase in wages over the English rate is for Montreal district, 75%, for Port Arthur and the great lakes, 108%, and for Pacific coast about 105%. This is a considerable handicap to overcome, because when a shipowner wants a ship to earn profits at the prevailing competitive freight rates, he cannot afford to invest in first cost double the amount he would be required to if his vessel was constructed in England. The trend in Great Britain is for higher wages, and in the near future wages may be more in proportion to those paid here, but they will have to rise considerably to equalize costs to any extent. Now that the British builders are relieved from the war tension, they will be devoting their thoughts to improved production methods, tending to still further decrease the cost of ships built there.

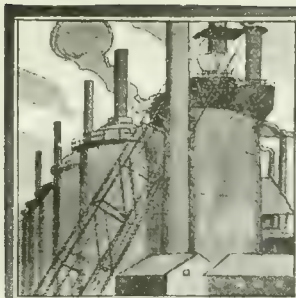
Some of the Bolsheviks declare they are the salt of the earth. Well that's all right, but what's the use of them climbing in as the pepper and mustard also?

Current Events in Photograph



**Remains of Sir
Wilfrid Lying
in State**

The funeral of the Liberal leader, held at Ottawa, was one of the most largely attended public funerals ever held in Canada. During the time that the remains lay in state thousands of people from all parts of the country visited the hall. The floral offerings, as may be seen from the photo, were unusually beautiful and came from all parts of the Dominion.



MARKET DEVELOPMENTS



Canadians Watch the U. S. Steel Situation

New Prices Expected—One Rumor Has it That Price of 2.90 Was Quoted on Some Canadian Business—Machinery is Still Selling at the Prices That Prevailed During the War

SOME weeks ago it seemed likely that the market would be swamped with second-hand machine tools, taken from the war shops of the country. The dealers find now that their fears in this regard are not being sustained, because much of this material is being absorbed by the trade, and other large quantities of it are being sent to the scrap heap. It is quite within sight that this material shall be accounted for inside of the next few months. In some ways the presence of this machinery on the market provides a way out for the man who cannot or will not go in and pay the present prices for a new machine tool. Although the war is over, prices for new machinery still stand high, practically one hundred per cent. higher than at the outbreak of the war. Dealers do not seem inclined to think that the high prices are holding back sales, as they state they are doing a very fair volume of business.

Several firms are at the point where they have concluded their investigations as to which lines they will follow, and it is quite reasonable to suppose they will be in the market to purchase definite lists before many weeks have passed.

Canadian interests are watching the movement in the steel-producing centres of United States where price jockeying is getting to be one of the chief pastimes. There have been rumors on the Street of a price of 2.90 base being quoted on a contract for delivery to this country, but it has not been possible to locate the price-cutter, or to find on what particular business the price was given. There are a couple of big plate jobs being hung up because those interested will not pay the 3-cent base price. Canadian dealers look for a decrease around the first of April, while Pittsburgh market men agree that some announcement may be made then.

The scrap market is stagnant. That really describes the situation. Dealers state that they are losing money on the present volume of business with a practically fixed overhead. Some of the larger yards go so far as to state that they are out of the market entirely for the present so far as buying goes, and there is undoubtedly a feeling that prices will scrape lower yet before the actual bottom of the market is touched.

MONTREAL SCRAP DEALERS TURN AND BATTER PRICE LIST LOWER

Special to CANADIAN MACHINERY

MONTREAL, Mar. 6.—Despite the fact that the prices on many commodities are constantly declining, business activity has apparently shown little improvement of a stable character. There is, however, a current of optimism pervading trade circles to the effect that the coming of spring will open new channels of business. Machine tool dealers are looking forward to a revival of the demand. Metal interests are anxiously awaiting trade developments and are endeavoring to stimulate buying by lowering prices. Scrap dealers are still more or less affected by the dull conditions, and price reductions are weekly developments.

Improvements in Steel Expected

It cannot be said that business activity has increased to any great extent, but the outlook is undoubtedly of a better character than a few weeks back. Dealers report that they are enabled to stock plate to better advantage, due to the lower price at the mills. There is an

evident tendency to show that users are beginning to realize that conditions will not be much better than at present, and enquiry that has been awaiting more satisfactory readjustment of price may now develop into tangible business. It is recognized that dealers here must meet the quotations of American mills, as far as possible, in order that consumers may be persuaded to purchase from warehouse supplies. This is necessary under existing conditions, as many have been holding off for more reasonable prices. Large purchasers are seldom reported, but the better inquiry would indicate that early activity would be on an increased scale. A factor that may have some bearing on early developments is the tendency to reduce wages at the mines and the mills, this having already been done in several cases. Little is expected in this connection, however, until the Government food control is removed and prices of commodities decline to lower levels.

Metals Still Decline

Metal demand is still of the hand-to-mouth character, and general activity is not pronounced. The recent inquiry has a tone of improvement, but little actual business is developing. Price quotations continue to seek lower levels, but even this, apparently, has little influence on the trade. Consumers are showing a reluctant spirit in acquiring metal for future requirements, and continued uncertainty is a large factor in maintaining this attitude. Spelter and lead has taken on a little firmness during the past week and prices in the States, particularly on lead, has strengthened. Demand here is comparatively light and dealers report a quiet week. This week's quotations reflect the downward trend, as a consequence of the dullness that prevails. Producers and dealers are attempting to stimulate a buying movement, but consumers are acting cautiously, covering only their immediate requirements. Coppers show a decline of 2 cents per lb., the price quoted being 21 cents for lake, and 22 cents for electro and castings. The better supply of tin, coupled with the light demand, continues to force down prices, the quotation of 58 cents

representing a decline of 4 cents per lb. Spelter is a little weaker here, but sales are steady; price of $9\frac{1}{4}$ cents is a drop, on the week, of $\frac{1}{4}$ cent per lb. Dealers here are asking $7\frac{1}{2}$ cents for lead, but the market is a little firmer. Antimony is the only metal that has attained its pre-war quotation, this week's decline of $\frac{1}{2}$ cent placing it on a par with that quoted in August, 1914, namely, 8 $\frac{1}{2}$ cents per lb. Aluminum is quiet, but firm, at 40 cents per lb.

Future Inquiry Improving

Varying reports are given by machine tool dealers as to the volume of business going. Some say that sales are good, while other intimate that there is little doing. Nearly all report a good inquiry, but actual sales seldom develop. There is a feeling that within the next two months the demand will show considerable improvement, as there is a possibility that orders for European requirements may be placed in the near future. Negotiation to this end are now developing in Government circles. A feature that must not be overlooked is the fact that, while the volume of sales may not compare favorably with those of a year ago, they are not associated in any way with destructive war work. This is very encouraging, and further confidence will follow the final settlement of European differences. Considerable used equipment is still offered for sale, and its disposal is having a quieting effect on new machinery business.

Scrap Prices Still Lower

Nothing has developed to indicate that scrap prices have reached a temporary resting place, as quotations still show a downward movement. The more notable declines are in the old metals and a few of the steel lines, the bulk of the latter maintaining their previous firmness. General business is light, but there is a tone of confidence that may eventually develop into greater activity. Some dealers report a fair volume of business, but invariably the sales are of a transient character, little interest being displayed on the part of the dealer or the consumer, to acquire more than for their immediate needs. On the old metals the quotations this week represent declines ranging from one to four cents per lb., nearly all the commodities being affected. Heavy melting steel and rails are down \$5 per ton, the respective nominal quotations being \$10 and \$15 per ton. Other declines are \$2 on shell turnings and boiler plate, the prices quoted being \$6 and \$12 per ton, respectively.

BUSINESS MOVING IN MACHINE TOOLS

Toronto Dealers Say They Have No Complaints—Looking for Cut in Steel

TORONTO.—The period of investigating market conditions and the other circumstances that are always necessary to know before venturing in any commercial enterprise are pretty well over in some cases. The chances seem

POINTS IN WEEK'S MARKETING NOTES

There is a feeling, quite decided and marked, that a cut will be made in steel around April 1.

Machine tool buying, is more brisk in New York than for some time past, the automobile industry being responsible for much of the demand.

Under the Sherman law steel manufacturers cannot meet to discuss and frame up prices, but they can come together to discuss Secretary Redfield's proposal for taking the war-time inflation out of prices.

One railroad shop in Belgium is out with a list for 50 machine tools.

Shipyards of France and Belgium are likely to come into the market as large buyers.

Machine tool dealers in Toronto report that business is satisfactory, while warehouses in most cases are doing a large trade.

Prices on machine tools still remain at a high level, which is about 100 per cent. above pre-war prices.

Dealers believe that all the available and desirable second-hand machinery from the war plants will soon be taken up. This equipment has not caused anything like the glutting of the market that was feared at one time.

One of the puzzling things in the steel situation is that mills should be operating at a high rate, especially the corporation plants, while practically no orders are being booked.

to be that before long we will have a number of announcements telling that firms are going to enter new lines, or further develop old ones that had been laid aside by reason of the pressure of war work.

Machine tool dealers report that a fair amount of equipment is on the move. There are several fairly large deals that should be wound up this week. Prices still stay on the high levels that were reached during war time.

Market Not Swamped

There was a feeling some weeks ago that the market was in danger of being overrun and swamped with used machinery that was being released in very great quantities upon the termination of the various war material contracts. Dealers assert that the most desirable in this is being absorbed without hurting the market, while much of the simon

pure single purpose material has gone to the yards of the scrap dealer.

"Do the high prices of machine tools hinder sales?" was the question put to one of the larger dealers in Toronto to-day.

"I would not say that the prices had much to do with most of the sales that are being put through," was the reply. "At present the average price of these tools is at least double what it was at the outbreak of the war. But we do not see much to show that prices are likely to break. Very often if the price seems a little stiff the customer will work his way out by going into the used machinery market, and is often able to pick up a tool that has not been in use very long. New lists that are coming out do not show concessions in prices. As long as firms can sell at the present prices there is not much chance for a lower level of values."

Price Must Come Down

There is a feeling in the market and in the trade generally that a cut is likely to come in steel prices. When? Perhaps on either side of April first. That, at least, is the opinion of one Toronto dealer whose guesses are seldom far off the mark. There seems to be a growing belief that prices of material are holding back considerable work that might otherwise be gone on with. For instance, there is a large amount of plate wanted for the building of penstocks for a power plant near St. Catharines. Figures given for 300 tons of plate were at 3c per pound, which is the lowest price announced for some time. The firm interested is reported to have kept out of the market on that reason, claiming they would use wood first. It is thought that a plate price of 2.50 would get that business. There is another case that illustrates the same point. An Ontario city has an estimate in for a very large bridge. The figures of the engineer stated that the city should get the bridge built for a certain sum. When the estimates were made it was found that the amount the city had voted to spend was away below that which the bridge would cost, and so the work is held up.

Just how much more business would be booked at a lower steel price is, of course, problematical, but several of the dealers are quite certain that the coming of a lower figure would bring a lot of buying to the market.

Business, though, is good for the warehouses, and is showing up much better than last month. The turnover in several places is at least fifty per cent. above the work last February, although it must be remembered that transportations are much better this year.

Some of the warehouse men are anxious for lower prices. They have in many cases pretty well cleaned out their high-price war material and are ready to take advantage of the cuts made from now on. One of the warehouse men, speaking to-day of prices, ventured the opinion with some degree of certainty that

the first of April would see a 2.60 price on plate, against the present 3c.

Scrap Market Still Poor

The fact that copper on the New York market shows a tendency to get down a little more yet leads some of the scrap metal dealers to anticipate lower levels before the turn for the better comes. "For the present," stated one of the largest yards to-day, "even at the low level of the list now, we are out of the market."

The suggestion was made by CANADIAN MACHINERY that if prices moved any lower, and material was offering,

it might be good policy for the yards to start and buy.

"That will not work out," was the reply. "As soon as we went into the market to buy there would be an immediate recovery from the low prices, and as a matter of fact we have all the stock we want for the present. Many of the yards are pretty well filled up, and some of them are carrying material for which rather high figures were paid. Although prices are low now in comparison with the last year or so, I do not think the bottom has been reached yet. At any rate we are not open to buy at present at the published lists."

Price Prospects

To one familiar with the finesse the steel trade has displayed over a period of many years it would appear that the steel producers are planning to exhibit a necessity as a virtue. Last week a number of prominent steel producers were meeting in New York and according to the authorized version they "discovered" that George N. Peek, recently named by Secretary Redfield as chairman of "The Industrial Board of the Department of Commerce" was in town, and accordingly they invited him in, to explain Secretary Redfield's plan for the deflation of war-time prices. Indications are that the steel producers are going to make a show of resisting the movement, but will gracefully yield at the last moment. The bald fact, however, is that when the steel producers last December tried to secure the sanction of the War Industries Board for the price reductions they desired to make, and failed, as the board would not even permit the schedule of reductions to be read into its minutes, they were even then hoping that some means would be found, about April 1, to secure any kind of Government sanction obtainable for a further reduction, the whole object being to make such and such a reduction and no more. If ordinary price cutting began it would become indiscriminate and there would be no way to put a peg in. Now the desired opportunity is very nicely presented, but if it were embraced with open arms Secretary Redfield's board would ask for reductions greater than the steel producers want to make, hence there is going to be a show of resistance, and there will be whatever delay can be occasioned. By reason of the Sherman law the producers would not feel free, in ordinary circumstances, even to have a general meeting to discuss prices, but now there is ample justification for calling a general meeting, to discuss Secretary Redfield's proposal. The meeting will accordingly be held in the near future. The procedure will probably be the same as that which worked so nicely last December. The meeting then did not consider prices in detail, but gave its committee power to act, by submitting reduced prices to the War Industries Board, and they adopted the reduced prices, no more and no less, even though the committee recommendations did not actually get before the War Industries Board and when, moreover, they had not even been presented at the meeting. This next meeting likewise will in all probability agree upon something without knowing just what it is, but when the suggestion or recommendation is announced, whether by Secretary Redfield's board or otherwise, they will adopt the prices and each producer individually will endeavor to adhere to those prices and not go below them. Last December's reductions averaged about \$4 a ton on the full line, seeing that wire products were not reduced at all, but the next reductions will probably average considerably more, possibly even more than \$10 a ton or half a cent a pound.

THE STEEL EXPERTS ARE PUZZLED BY PRODUCTION AND SALES SHOWING

Special to CANADIAN MACHINERY

PITTSBURGH, Mar. 6.—The iron and steel market situation has become much more interesting, but chiefly because it is more puzzling. The high rate of mill operation is difficult, if not impossible, of explanation, but it must be accepted as a fact, and as a fact what it portends is a matter of doubt. It may mean that too much steel is being made now, or it may mean that the country's steel-absorbing power has so greatly increased that it is going to be very easy to find employment for all the capacity. Then as to prices, the steel mills are talking more strongly than formerly about the improbability of there being reductions, at least in the near future, when it rather appears that the market is about to decline, and is indeed on the very verge. The steel producers would prefer that declines should come as a surprise to buyers, for anticipated declines lead to postponement of buying.

High Operating Rate

The average rate of steel mill operation is fully 75 per cent. Considering the extreme dullness in, nearly all lines of consumption this is a remarkable rate, particularly when one considers that during the war, or since 1914, the steel making capacity has increased 40 per cent. It stood at about 35,000,000 gross tons of steel ingots per annum at the end of 1913—also at the end of 1914 as there was no new construction to speak of in that year—while now it is 49,000,000 tons, actual commercial, not rated, capacity. Thus a 75 per cent. operation now would mean the same tonnage as a 105 per cent. operation in 1913, but as a matter of fact the mills did not run full throughout 1913, and produced only 30,280,130 tons of ingots in the year, against 30,284,682 tons in 1912, each year showing 5,000,000 tons more output than the best preceding year.

In detail, as to operating rates, it may be said that the Steel Corporation easily leads. Difficult as it has been for the trade to believe it, the Steel Corporation has been operating at more than 90 per cent. of capacity. Among the large independents the rate has commonly been in the neighborhood of 65 per cent. in the past fortnight, but a few are running at higher than that. Then

among the small independents there is the most remarkable diversity. For instance, one small steel producer in Pittsburgh and another in Buffalo are closed entirely, while there are several small independents that are operating at 90 per cent. or more. This divergence is due chiefly to differences in the classes of trade served, and in general there are great differences due to the fact that some mills have cultivated a regular line of customers while others have gone out to sell where there was the most money to be obtained, a policy that is very profitable at one time and correspondingly unprofitable at another. The average operating rate in January was 85 per cent., as shown by the American Iron and Steel Institute statistics, as quoted in this report a fortnight ago.

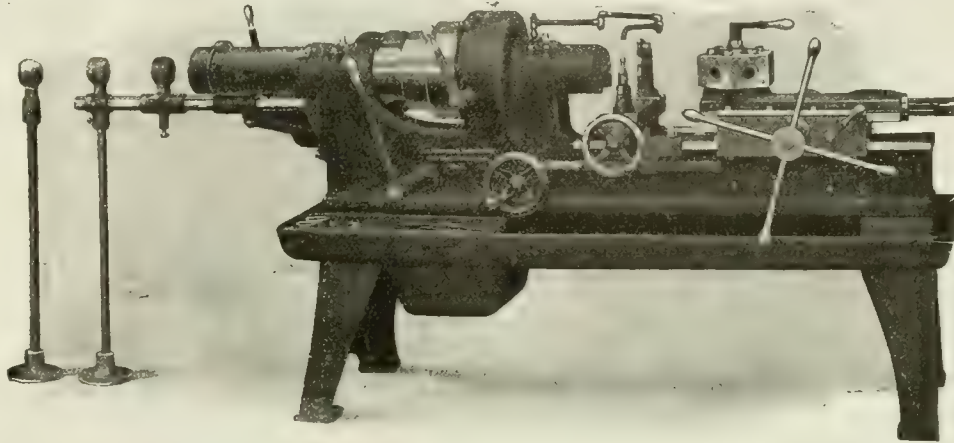
Contrasted with this high operating rate, with an output comparable to the best rate attained before the war when all consuming lines were busy and taking as much steel as anybody thought they could take, is the present stagnation in the consuming markets. The only specific instance of great activity is the automobile trade, and it cannot possibly engage 5 per cent. of the steel producing capacity. The agricultural implement factories are working fairly well, but are understood to be depending largely upon stocks. It has come out as to both steel and coal that various industries, essential and otherwise, had much larger stocks at the end of the war than would be suggested by the fears they expressed that war-time regulations would make trouble. The regular building trades are doing nothing, jobbers are ordering only from hand to mouth, and manufacturing consumers as a rule are but slightly employed.

Explanations offered for the apparently contradictory showing are along two lines, one being that the Steel Corporation is building up stocks, which would account for a little tonnage, but not a great deal, while the other is that war-time construction is still largely in progress, though when it comes to citing details few can be mentioned. There is the Government's nitro plant in West Virginia and of course there is considerable shipbuilding.

Warner & Swasey Screw Machines

For large output and close limits—If you are figuring on screw machine work you can depend on W. & S. machines being right for the job.

We can supply you from stock immediately.



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"If It's Machinery, Write Williams"

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Acid Electric STEEL CASTINGS

Acid Electric Steel Castings show superior ability to resist wear and crystallization. They are smooth in texture, free from Blow Holes, and machine perfectly. We specialize in

Railroad and Other High Grade Castings

up to 15 tons, any specification. Electric Steel Castings COST NO MORE than ordinary Steel Castings.

Prices on Application—Prompt Deliveries

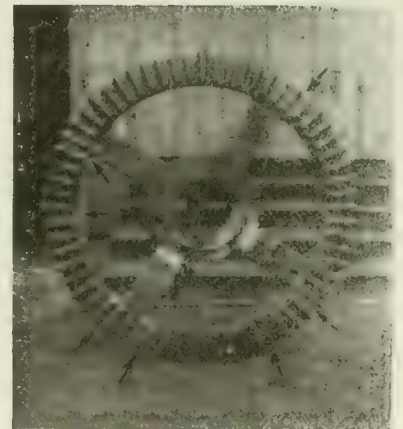
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Bevel gear 85" diameter after being
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CONDITIONS IMPROVED IN NEW YORK MARKET AND MORE SELLING IS DONE

Special to CANADIAN MACHINERY

NEW YORK, March 6.—Business in machine tools is showing an improvement. The automobile trade is particularly active as a buyer and some of the export prospects, which have been afloat for some weeks, show signs of developing into actual orders.

Most of the domestic activity is confined to the automobile manufacturing trade, and orders placed within the past two or three weeks at Detroit, Cleveland and Cincinnati are estimated at several million dollars. The General Motors Corporation plans expansion of nearly all of its plants and will do further buying. The Cleveland Automobile Co., which will manufacture a low-priced car at Cleveland in association with the Chandler Motor Company, will erect a new plant and buy equipment for it.

Large buying by the automobile trade is attributed to the fact that several of the large companies are planning an annual production of cars which will exceed any record of past years. The activity extends to manufacturers of accessories and parts. The Weekes-Hoffman Co., Syracuse, N.Y., which has received

a contract for gears for Ford cars, has bought about \$100,000 worth of new tools. The New Process Gear Corporation, also of Syracuse, which recently issued a list of about 50 tools, intended for gear work, has not yet bought.

It now appears probable that the French Government will permit sales of American machine tools to machinery houses in France, provided a year's credit is given. Such sales will probably total about \$40,000,000. In addition to this, the French High Commission will purchase a large list of tools for reconstruction work in France and Belgium. The Standard Oil Co. of New Jersey has received quotations on a list of equipment to be shipped to Roumania and these machines will soon be bought. An engineering firm has issued an inquiry for about 50 tools for a railroad car shop in Belgium and a New York export house has an inquiry out for more than 50 plate-working machines for a shipyard in Japan. There are other inquiries in the market for shipyards in France and Belgium, on which some action is expected soon.

SHADING PIG IRON PRICES WOULD NOT HELP SITUATION

THOSE who follow the pig iron market have many explanations for the small amount of actual business being placed. They may point to inquiries and prices, but the fact remains that not much business is resulting. The conditions at some of the producing points may be summarized as follows:

Chicago.—Many of the foundries have been forced to ask the makers to defer shipments owing to the amount of pig they are stacking in their yards. The best part of this is that these requests are not as numerous now as they were a little while ago. Some progress is being made in the matter of settling claims for the cancellation of war work.

New York.—Most of the foundries in this district have now large stocks of raw material on hand. Many of them have had large deliveries of raw material made since the armistice was signed, and output has dropped off. High silicon foundry iron is in considerable demand, owing to the amount of scrap that is being put through in some of the heats.

Pittsburgh.—Some of the inquiries that are being renewed by the larger buyers are so small as to lead to the belief that they are out more to test the market than for any other purpose. There is talk of cut prices, but such a step, it is felt, would only serve to remove the stability from the entire business at a time when it should be maintained. Production figures at some of

the furnaces are starting to show a slight downward tendency.

Buffalo.—The fact that much of the buying done now is on certain well specified analysis shows that purchasing is for actual needs. Users are taking material on old contracts, but no new inquiries are bringing real business to the surface.

Cleveland.—Some furnaces report that they are shipping all the iron they can produce. Prices hold well and the only concessions are those made by interests that want to absorb part of the freight rates, so that those buying from them shall be on equal terms with purchases made from producers nearer to the point of use.

Cincinnati.—Furnaces in the south report in many cases that no interest seems to want to buy pig iron of any kind. The market is unusually quiet and there are no inquiries.

St. Louis.—Melters are not looking for any great revival in business here. In fact many of the foundries are so well filled with material that furnaces are beginning to wonder where their output is going to be marketed. The \$31 price is becoming more common.

Philadelphia.—The fact that a lot of 500 tons was the best piece of business in sight for the week gives an idea of the market here, although furnaces are hopeful on account of the fact that nothing much is being piled.

HOW BRITISH FIRMS TURN TO PEACE WORK

Transformation of industries in Britain from a war to a peace basis is going on with a surprising degree of celerity. The "London Times" commented recently on the rapidly-changing industrial situation as follows:

"Every day sees some fresh progress in the transition of industries from munitions to peace production," says "The Times." "The seventy small private firms in the neighborhood of Leicester which were engaged on munitions have all returned to their pre-war work. Enterprising firms are in many cases not only undertaking their former manufactures, but others also, which are quite new to them, in an endeavor to capture trade formerly held by other countries.

"One such firm at Hull, in order to meet German competition, is beginning the manufacture of cast iron valves for both water and steam purposes. They are also laying down a plant for the making of malleable iron fittings. The firm hopes to retain a large percentage, if not all, of the women previously employed on munitions. A Newcastle company, changing over to general steel castings, hopes, similarly, to retain the female labor for core-making and laboring."

Activity in Many Lines

Other transformations of industry include the following:

A Nottingham firm is making works additions in order to increase the output of malleable castings for the motor car trade. The bulk of them before the war were imported.

A firm of woodworking machinists proposes to undertake the manufacture of precision grinders and small surface grinders.

A firm of airplane makers is turning over to its pre-war trade of shop-fittings, jewellers' cases, etc., and has enough orders for three years.

Tinplate manufacturers in South Wales are very busy, and likely to continue so for some considerable time.

A Newcastle firm is changing over from bombs and eighteen-pounder shrapnel shells to gas and steam pipes and shipyard castings.

A bicycle firm proposes to make motorcycles—a new departure for them; while another company has added standard railway wagons to its pre-war productions.

A firm making seed drills has sufficient orders to keep it busy till the end of the year, and a lace manufacturer reports a somewhat similar state of affairs.

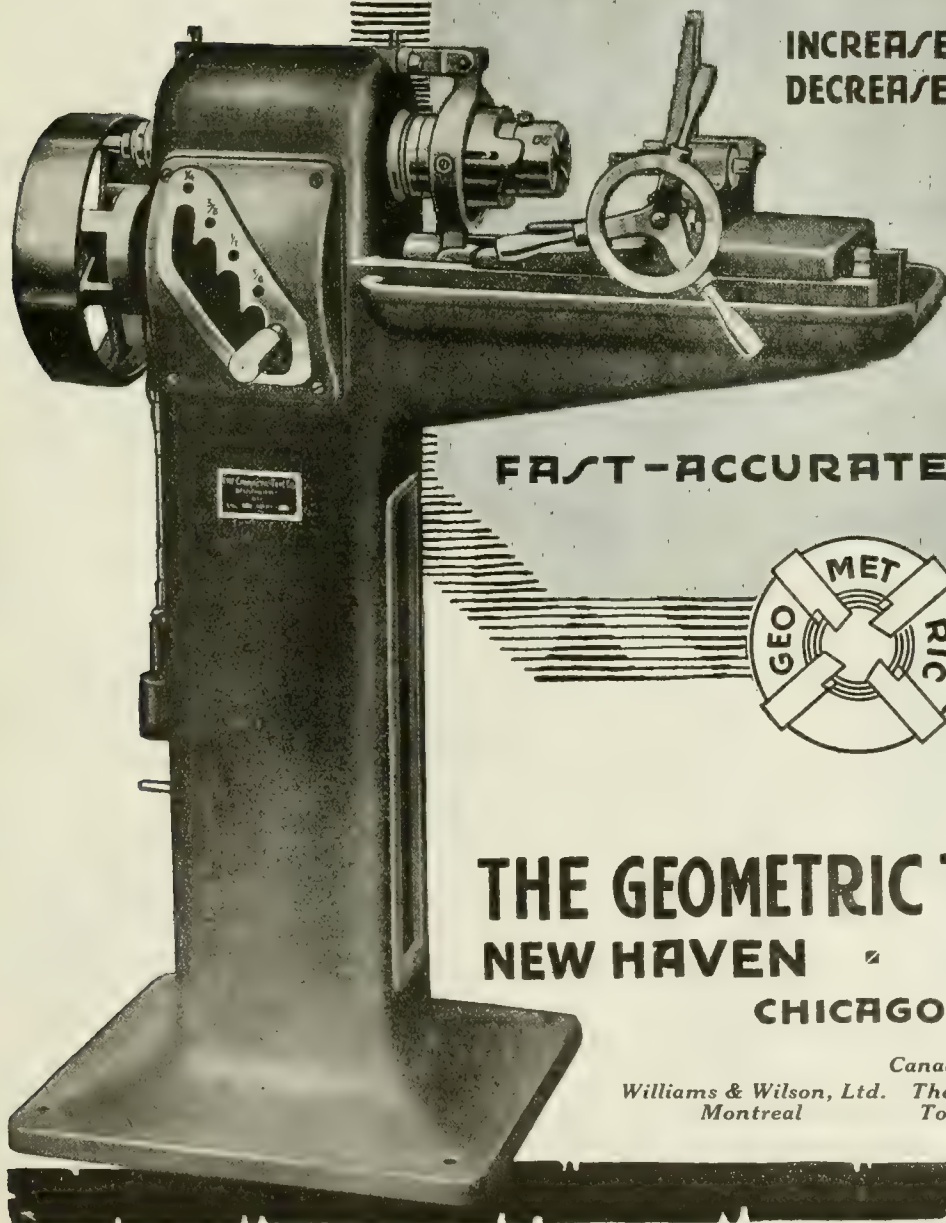
A Glasgow firm is employing the greater part of the labor formerly employed in munition work on boilers, cranes, stokers, etc. Another firm has absorbed all its staff, including women, on pump-making.

A firm of sugar-mill machinery makers anticipates a busy time for at least a year. It is endeavoring to capture the former German trade with Java in sugar machinery.

GEO METRIC

THREADING MACHINES

INCREASE THE OUTPUT
DECREASE THE EXPENSE



FAST-ACCURATE-SIMPLE



THE GEOMETRIC TOOL COMPANY
NEW HAVEN ■ ■ ■ CONN.
CHICAGO STORE

Canadian Agents:

Williams & Wilson, Ltd. The A. R. Williams Machinery Co., Ltd
Montreal Toronto, Winnipeg and St. John, N.B.

THE SCRAP MARKET IS STILL A CRIPPLE AND IN POOR SHAPE

IN Canada the scrap market shows no signs of coming to life. In fact there are indications that further skidding may be done before anything approaching a basis is reached. In the United States the situation is sized up as follows:

Chicago—The feeling here is regarded as much better, and the belief is expressed that the bottom of the price slide has been reached. Certain lines of scrap have nothing to test them, as manufacturing is restricted.

New York—The mills were in the market here for a short time, but it is apparent that they have covered all their interests as no more purchases are being made for them.

Pittsburgh—A variety of guesses have been made as to whether the real bottom of the market has been reached, and the variety of answers is very large. Low phosphorus scrap would be in demand were the price to come a little lower, and several dealers are watching the market for this reason.

Buffalo—There are several cases in this district where dealers have had chances to fill orders, but have not seen their way clear to close on account of not knowing where to get the material.

Cleveland—Dealers are putting up the claim that prices right now are on a level with those of 1914. They point to increased prices for labor and freight,

and allowing for these, say that they are now on the pre-war level. It is hard to see how prices can go much lower.

Cincinnati—Cancellations for scrap contracts are still quite common here. Dealers claim that they are not making ends meet on the amount of trade that is passing. In fact every sale that is made now is for some definite purpose and is generally shipped and used at once.

St. Louis—The fact that no reductions were made during the week is taken to mean in some quarters that the end of the toboggan in scrap prices has arrived. This is merely the opinion of many dealers, as well as the wish, and it may be that lower levels will yet be reached before trading is again taken on.

Birmingham—Business is at such a low ebb in this district that some of the dealers threaten to close up and wait for a return of better conditions. Some of the more pessimistic ones do not look for any improvement for three or four months.

Philadelphia—Contrary to general expectations there has been another decline in almost every grade of scrap that comes on the market, but the feeling is growing that there cannot be much space between the present prices and the lowest that can come. There is a greater willingness on the part of certain buyers to come into the market now.

representation to the British Ministry of Shipping for the release of the company's ships requisitioned by the Government. It is claimed that considerable loss has been experienced by the coal company as a result of the great falling off in coal shipments, and the hold that the American interests are securing on the market previously served by the company. Sir Robert Borden will be urged to take steps to remedy this condition.

John Burns, who has been acting as assistant works manager at the Angus Shops of the C. P. R. at Montreal, has been appointed to the position of works manager in place of H. Osborne, retired. Mr. Burns is a native of Montreal, having been born here in 1877. He served his apprenticeship with the Grand Trunk, and joined the C. P. R. in 1898. He has held various subordinate positions prior to his present appointment.

H. Osborne, late works manager of the Angus Shops of the C. P. R., has been with the mechanical staff of this company for over 35 years, and has just recently been retired to enjoy a period of well-merited rest after many years of diligent and faithful service.

P. M. Draper, official representative of Canadian labor at the Peace Conference, is now on his way back from Europe, having sailed on the Mauretania.

NEW MANAGERS ARE NAMED FOR POLSONS

**R. J. Cluff and M. E. Forbes Will Assume
Executive Control**

More profitable operation of the Polson Ironworks, Toronto, may be expected following slight changes now taking place in the management. A joint general managership is being arranged. Col. J. B. Miller is relinquishing the position of general manager, but continuing that of president. His place will be filled by two energetic executives, R. J. Cluff, of Toronto, and M. E. Forbes, of Dayton, Ohio. Mr. Forbes has up till the present been vice-president and general manager of the Dayton, Ohio, Production Company.

Except for this change in personnel affecting the active management of the company's business, there is no alteration in administration of the Polson Ironworks. Any suggestion that there has been a change of ownership of the plant is emphatically and authoritatively denied.

THE NEW SCHEDULES

Youngstown, Ohio.—Under terms of the bi-monthly wage settlement between representatives of the Amalgamated and Western Bar Iron Association, puddlers will be paid \$15.80 a ton during the March-April period, a reduction of \$1.75 from the \$16.80 rate in effect since September 1, 1918. Puddlers' wages began to advance in November, 1914. The slump just announced is the first in almost four and a half years. According to the settlement just made, the average selling price for bar iron in January-February was \$62 a ton, against \$69 throughout the last half of 1918.

MONTREAL NOTES FOR THE WEEK

CANADIAN manufacturers have been invited by the Canadian Trade Commission to attend meetings in Ottawa for the purpose of forming groups through which information secured by the commission may be communicated to the trades. Present European business is of an urgent character, and therefore some system should be established whereby the information and requirements can be given immediately to all concerned. All those interested in this proposition are requested to be represented at these meetings. The first meeting will be held this week and will deal with the agricultural machinery industry; dates of subsequent meetings will be announced later.

Plans now under consideration by the Provincial Government for the rehabilitation of the returned soldiers, provide for the free allotment of land, not only to the returned men of the Province of Quebec, but to any other soldiers of Canada or the British Empire. In addition to the land grant, it is the purpose, as far as possible, to establish settlements, so that men may be grouped in units for their mutual association.

R. M. Wilson, M.E.I.C., chief engineer of the Montreal Light, Heat and Power Co., at a recent meeting of the local branch of the Engineering Institute of Canada, read a paper that dealt with the ice problems in connection with the oper-

ation of Hydro-Electric power plants. He described in detail the methods for dealing with ice troubles at the Cedars plant. With experience and improved design of hydraulic equipment, Mr. Wilson believes that machinery can now be designed that will be immune from ice troubles, excepting, perhaps, only those depending on canals running across country, where means cannot be taken to mitigate or eliminate the difficulties.

A series of free lectures has been planned by Dean Lee, of the Faculty of Law, McGill University, for the purpose of disseminating correct information on Government institutions, at a time when the air is filled with projects of change. These lectures are an attempt at a scientific enquiry into Government as it is. The lecturers will constitute various professors of McGill University.

Record winter operations on the St. Lawrence this year are being reported from time to time. The latest report is to the effect that the ice-breaker Montcalm, which accompanied the steamer "Canadian Voyageur" from Quebec to Halifax in January of this year, will make a try for the St. Lawrence at an early date, success meaning another mid-winter record.

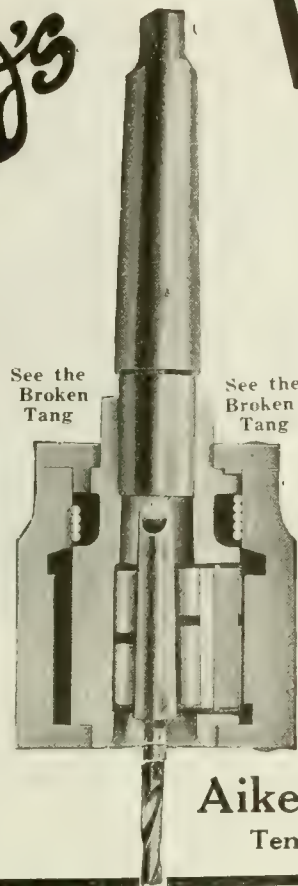
Mark Workman and **E. M. MacDonald**, president and legal adviser respectively of the Dominion Iron and Steel Co., both of whom are now in Europe, are making

Aikenhead's

This Chuck will quickly earn its cost many times over. You need it on every drill press in your shop.

It has neither collets, sockets nor keys. Nothing about it can get out of order.

Holds No. 1, 2 or 3 Morse Taper Drills.



Wahlstrom Chuck

Saves minutes every time a tool is changed, because it self-centers the tool, enabling the operator to remove one drill and insert another in two seconds, without stopping spindle.

In hundreds of shops this Wahlstrom Automatic Chuck has increased output 50 per cent. It drills, reams, counterbores and taps **without stopping spindle.**

No strain can weaken the grip of this Wahlstrom Automatic, or cause slippage, for the cam action is such that the jaws grip more firmly as resistance on the tool increases.

Write for Booklet

Aikenhead Hardware Limited

Temperance Street, TORONTO, CANADA

With This Pipe Tool ONE Man Can Do the Work of TWO

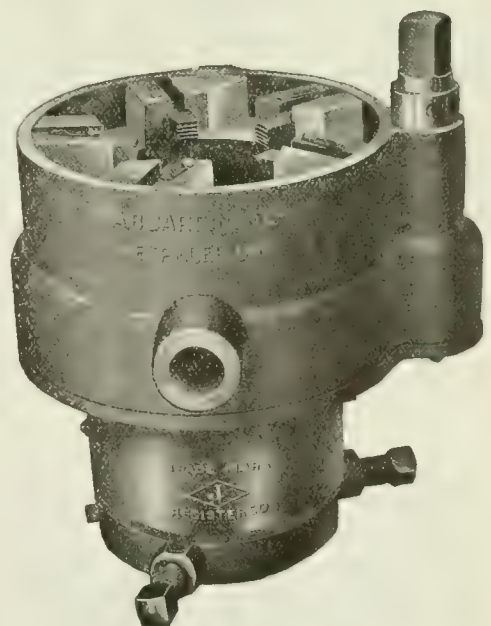
This Jardine tool takes much of the labor out of pipe cutting and threading because the cutters in this tool never "squeeze." The actual cutting is done by the clean-cutting mouth threads; the back threads of the cutters merely steady the tool.

Aikenhead's Jardine Pipe Threading Tools

enable one man to do the work of two. For instance: In one minute one man cuts 2" pipe; in 8 minutes, 4" pipe; in 16 minutes, 6" pipe; in 30 minutes, 8" pipe. And this is no exceptional record for Jardine Tools; it is what you may expect from an average workman in an average shop.

The Jardine Tool illustrated has leading screws and gears protected from dirt and chips, and the ratchet enables one man to thread 2½" to 4" pipe in ditches or positions close to walls or ceilings. **Order a Jardine or write for further particulars.**

Aikenhead Hardware Limited
17 Temperance St. TORONTO



GEARED ADJUSTABLE THREADING
TOOL No. 22

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON

Grey forge, Pittsburgh	\$31 40
Lake Superior, charcoal, Chicago	38 85
Standard low phos., Philadelphia	33 60
Bessemer, Pittsburgh	33 60
Basic, Valley furnace	30 00

Government prices

	Montreal	Toronto
Hamilton		
Victoria		

IRON AND STEEL

Per lb. to Large Buyers	Cents
Iron bars, base, Toronto	\$ 4 75
Steel bars, base, Toronto	5 00
Steel bars, 2 in. to 4 in. base	6 00
Steel oars, 4 in. and larger base	7 00
Iron bars, base, Montreal	4 55
Steel bars, base, Montreal	5 05
Reinforcing bars, base	4 50
Steel hoops	7 50
Norway iron	11 00
Tire steel	5 50
Spring steel	8 00
Brand steel, No. 10 gauge, base	5 05
Chequered floor plate, 3-16 in.	12 20
Chequered floor plate, 1/4 in.	12 00
Staybolt iron	11 00
Bessemer rails, heavy, at mill	
Steel bars, Pittsburgh	2 70
Tank plates, Pittsburgh	3 00
Structural shapes, Pittsburgh	2 80
Steel hoops, Pittsburgh	3 30
F.O.B., Toronto Warehouse	
Steel bars	5 50
Small shapes	5 75
F.O.B. Chicago Warehouse	
Steel bars	4 10
Structural shapes	4 20
Plates	4 45

FREIGHT RATES

	Per 100 lbs.	C.L.	L.C.L.
Pittsburgh to Following Points			
Montreal	29	39 1/2	
St. John, N.B.	47 1/2	63	
Halifax	49	64 1/2	
Toronto	23 1/2	27 1/2	
Guelph	23 1/2	27 1/2	
London	23 1/2	27 1/2	
Windsor	23 1/2	27 1/2	
Winnipeg	81	106 1/2	

METALS

Lake copper	\$21 00	\$ 22 00
Electro copper	20 00	22 00
Castings, copper	20 00	20 00
Tin	58 00	62 00
Spelter	9 25	8 50
Lead	7 50	6 50
Antimony	8 50	8 50
Aluminum	40 00	40 00

Prices per 100 lbs.

PLATES

	Montreal	Toronto
Plates, 1/4 up	\$ 5 50	\$ 5 50
Plates, 3-16 in.	5 75	5 75

Per 100 lbs.

Per ton

Price List No. 38

Standard Butt weld

	Per 100 feet	
1/8 in.	\$ 6 00	\$ 8 00
1/4 in.	4 68	6 81
3/8 in.	4 68	6 81
1/2 in.	6 21	7 78
3/4 in.	7 82	9 95
1 in.	11 56	14 71
1 1/4 in.	15 64	19 90
1 1/2 in.	18 70	23 76
2 in.	25 16	32 01

2 1/2 in.	40 37	51 19
3 in.	52 79	66 94
3 1/2 in.	67 16	84 18
4 in.	79 57	99 74

Standard Lap weld

2 in.	38 81	35 34
2 1/2 in.	42 12	52 36
3 in.	55 08	68 47
3 1/2 in.	69 00	86 94
4 in.	81 75	103 00
4 1/2 in.	93	1 18
5 in.	1 08	1 37
6 in.	1 40	1 78
7 in.	1 83	2 32
8L in.	1 93	2 44
8 in.	2 22	2 81
9 in.	2 66	3 36
10L in.	2 46	3 12
10 in.	3 17	4 02

Terms 2% 30 days, approved credit.

Freight equalized on Chatham, Guelph, Hamilton, London, Montreal, Toronto, Welland.

Prices—Ontario, Quebec and Maritime Provinces.

WROUGHT NIPPLES

4" and under, 45%.
4 1/2" and larger, 40%.
4" and under, running thread, 25%.
Standard couplings, 4" and under, 35%.
4 1/2" and larger, 15%.

OLD MATERIAL

Dealers' Buying Prices.

	Per 100 Pounds	Montreal	Toronto
Copper, light	\$10 50	\$13 00	
Copper, crucible	13 00	15 00	
Copper, heavy	13 00	15 00	
Copper wire	13 00	15 00	
No. 1 machine composition	10 00	14 00	
New brass cuttings	8 00	10 00	
Red brass turnings	8 00	10 00	
Yellow brass turnings	6 00	8 00	
Light brass	5 00	7 50	
Medium brass	8 00	9 00	
Scrap zinc	4 00	5 00	
Heavy lead	3-4	5 00	
Tea lead	2-3	3 50	
Aluminum	15 00	12 00	

	Per Ton	
Heavy melting steel	10 00	14 00
Shell turnings	6 00	6 00
Boiler plate	12 00	11 00
Axles (wrought iron)	20 00	15 00
Rails	15 00	11 00
Malleable scrap	15 00	13 00
No. 1 machine cast iron	18 00	14 00
Pipe wrought	9 00	7 00
Car wheels	20-22	18 00
Steel axles	22 00	20 00
Mach. shop turnings	6 00	6 00
Stove plate	14 00	14 00
Cast boring	8 00	8 00

BOLTS, NUTS AND SCREWS

	Per Cent	
Carriage bolts, 3/8" and less	10	
Carriage bolts, 7-16 and up	net	
Coach and lag screws	25	
Stove bolts	55	
Plate washers	List plus 20	
Elevator bolts	5	
Machine bolts, 7-16 and over	net	
Machine bolts, 3/8 and less	10	
Blank bolts	net	
Bolt ends	net	
Machine screws, fl. and rd. hd., steel	27 1/2	

Machine screws, o. and fl. hd., steel	18
Machine screws, fl. and rd. hd., brass	add 20
Machine screws, o. and fl. hd., brass	add 25
Nuts, square blank	\$1 50
Nuts, square, tapped	1 75
Nuts, hex., blank	1 75
Nuts, hex., tapped	add 2 00
Copper rivets and burrs, list plus	30
Burrs only, list plus	50
Iron rivets and burrs	25
Boiler rivets, base 3/4" and larger	\$8 50
Structural rivets, as above	8 40
Wood screws, flat, bright	72 1/2
Wood screws, O. & R., bright	67 1/2
Wood screws, flat, brass	37 1/2
Wood screws, O. & R., brass	32 1/2
Wood screws, flat, bronze	27 1/2
Wood screws, O. & R., bronze	25

MILLED PRODUCTS

	Per Cent	
Set screws	25	
Sq. & Hex. Head Cap Screws	20	
Rd. & Fil. Head Cap Screws	net	
Flat But. Hd. Cap Screws	plus net	
Fin. & Semi-fin. nuts up to 1 in.	25	
Fin. & Semi-fin. nuts, over 1 in., up to 1 1/2 in.	20	
Fin. and Semi-fin. nuts over 1 1/2 in., up to 2 in.	plus 10	
Studs	net	
Taper pins	40	
Coupling bolts, plus	10	
Planer head bolts, without fillet, list plus	10	
Planer head bolts, with fillet, list plus 10 and	10	
Planer head bolt nuts, same as finished nuts		
Planer bolt washers	net	
Hollow set screws	list plus 20	
Collar screws	list plus 30, 10	
Thumb screws	20	
Thumb nuts	65	
Patch bolts	add 40, 10	
Cold pressed nuts to 1 1/2 in.	add \$4 50	
Cold pressed nuts over 1 1/2 in.	add 7 00	

BILLETS

	Per gross ton	
Bessemer billets	\$43 50	
Open-hearth Billets	43 50	
O.H. sheet bars	47 00	
Forging billets	56 00	
Wire rods	57 00	

Government prices.

F.O.B. Pittsburgh.

NAILS AND SPIKES

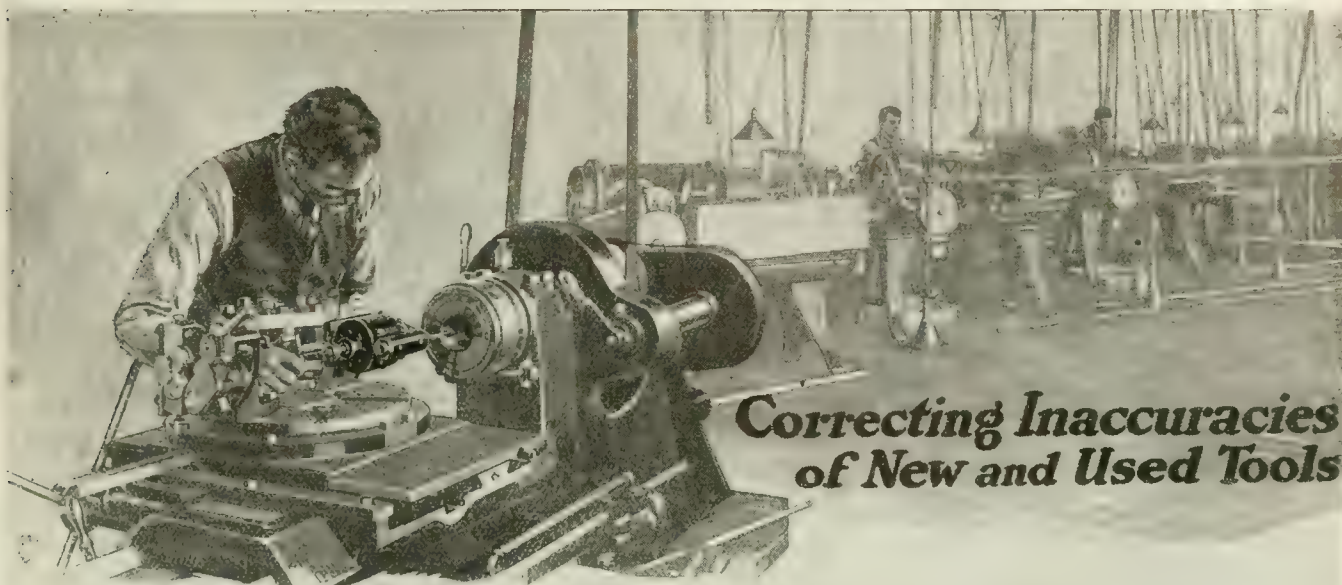
Wire nails	\$5 50	\$5 30
Cut nails	5 85	5 65
Miscellaneous wire nails		60%
Spikes, 3/8 in. and larger	\$7 50	
Spikes, 1/4 and 5-16 in.	8 00	

ROPE AND PACKINGS

Drilling cables, Manila	0 39
Plumbers' oakum, per lb.	0 10
Packing, square braided	0 38
Packing, No. 1 Italian	0 44
Packing, No. 2 Italian	0 36
Pure Manila rope	0 37
British Manila rope	0 31
New Zealand hemp	0 31
Transmission rope, Manila	0 43
Cotton rope, 1/4-lb. and up	0 74

POLISHED DRILL ROD

Discount off list, Montreal and Toronto	net
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Correcting Inaccuracies of New and Used Tools

GRINDING chuck pads true with the spindle of the screw machine is a positive, easy method of obtaining accuracy when you have a **DUMORE**. War-time production has told heavily upon machines and tools—your own shop verifies this—and the change back to a peace basis demands a start with efficient equipment.

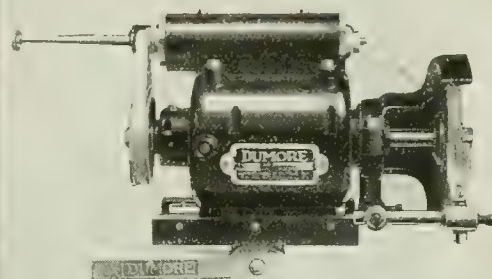
Your products are always as good as your tools—never better. And the accuracy of your jigs, dies and gages depends upon your facilities for grinding them. Close limits can be obtained only from a grinder having both speed and balance. That's why the **DUMORE** carries a dynamically balanced armature and operates at speeds ranging from 10,000 to 50,000 R. P. M. Chatter-marks, taper and bell-mouth are positively eliminated.

Now is the right time to put your tools in shape. Let your dealer demonstrate right in your own shop what a **DUMORE** grinder will will do for you.

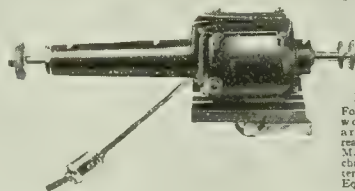
WISCONSIN ELECTRIC CO.

2909 16th St.

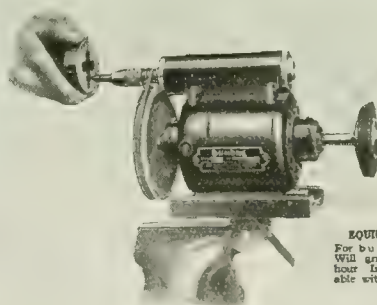
RACINE, WIS



EQUIPMENT A
For general tool room use, includes High Speed Internal Spindle A with reach 3 inches. 30,000 R.P.M. comes fully equipped. Weighs 17 1/2 pounds.



EQUIPMENT B
For deep internal work. Extension arm has 10-inch reach. 10,000 R.P.M. Arm interchangeable with internal spindle on Equipment A.



EQUIPMENT C
For button dies. Will grind 20 an hour. Interchangeable with A and B.

DUMORE HIGH SPEED GRINDERS

MISCELLANEOUS

Solder, strictly	0 34
Solder, guaranteed	0 39
Babbitt metals	18 to 70
Soldering coppers, lb.	0 58
Lead wool, per lb.	0 14
Putty, 100-lb. drums	6 75
White lead, pure, cwt.	17 80
Red dry lead, 100-lb. kegs, per cwt.	15 50
Glue, English	0 35
Tarred slater's paper, roll	1 30
Gasoline, per gal., bulk	0 33
Benzine, per gal., bulk	0 32
Pure turpentine, single bbls., gal.	1 10
Linseed oil, raw, single bbls.	1 70
Linseed oil, boiled, single bbls.	1 73
Plaster of Paris, per bbl.	4 50
Sandpaper, B. & A.	List plus 43
Emery cloth	list plus 37½
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 07
Rosin "G," per lb.	0 08
Borax crystal and granular	0 14
Wood alcohol, per gallon	2 00
Whiting, plain, per 100 lbs.	2 50

CARBON DRILLS AND REAMERS

S.S. drills, wire sizes up to 52	35
S.S. drills, wire sizes, No. 53 to 80	40
Standard drills to 1½ in.	40
Standard drills, over 1½ in.	40
3-fluted drills, plus	10
Jobbers' and letter sizes	40
Bit stock	40
Ratchet drills	15
S.S. drills for wood	40
Wood boring brace drills	25
Electricians' bits	30
Sockets	40
Sleeves	40
Taper pin reamers	net
Drills and countersinks	list plus 40
Bridge reamers	50
Centre reamers	10
Chucking reamers	net
Hand reamers	10
High speed drills, list plus	75
High speed cutters, list plus	40

COLD ROLLED SHAFTING

At mill	list plus 40%
At warehouse	list plus 60%
Discounts off new list. Warehouse price at Montreal and Toronto	

IRON PIPE FITTINGS

Malleable fittings, class A, 20% on list; class B and C, net list. Cast iron fittings, 15% off list. Malleable bushings, 25 and 7½%; cast bushings, 25%; unions, 45%; plugs, 20% off list. Net prices malleable fittings; class B black, 24½c lb.; class C black, 15½c lb.; galvanized, class B, 34c lb.; class C, 24½c lb. F.O.B. Toronto.

SHEETS

	Montreal	Toronto
Sheets, black, No. 28..	\$ 7 00	\$ 6 50
Sheets, black, No. 10..	6 50	6 00
Canada plates, dull, 52 sheets	8 50	8 10
Can. plates, all bright	8 50	9 50
Apollo brand, 10½ oz. galvanized		
Queen's Head, 28 B.W.G.		
Fleur-de-Lis, 28 B.W.G.		
Gorbal's Best, No. 28..		
Colborne Crown, No. 28		
Premier, No. 28 U.S..	8 20	
Premier, 10½ oz.	8 50	
Zinc sheets	20 00	20 00

PROOF COIL CHAIN

¼ in., \$14.35; 5-16 in., \$13.85; ¾ in., \$13.50; 7-16 in., \$12.90; ½ in., \$13.20;	
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\$13.00; ¾ in., \$12.90; 1 inch, \$12.65; Extra for B.B. Chain, \$1.20; Extra for B.B.B. Chain, \$1.80.

ELECTRIC WELD COIL CHAIN B.B.
 ½ in., \$13.00; 3-16 in., \$12.50; ¼ in., \$11.75; 5-16 in., \$11.40; ¾ in., \$11.00; 7-16 in., \$10.60; ½ in., \$10.40; 5/8 in., \$10.00; ¾ in., \$9.90.

Prices per 100 lbs.

FILES AND RASPS.

	Per cent.
Globe	50
Vulcan	50
P.H. and Imperial	50
Nicholson	32½
Black Diamond	32½
J. Barton Smith, Eagle	50
McClelland, Globe	50
Delta Files	20
Disston	40
Whitman & Barnes	50

BOILER TUBES.

Size	Seamless	Lapwelded
1 in.	\$28 00	\$.....
1¼ in.	32 00	
1½ in.	35 00	28 00
1¾ in.	35 00	28 00
2 in.	40 00	28 00
2¼ in.	43 00	30 00
2½ in.	45 00	35 00
3 in.	52 00	40 00
3¼ in.		47 00
3½ in.	62 00	48 00
4 in.	70 00	60 00

Prices per 100 ft., Montreal and Toronto less 10.

OILS AND COMPOUNDS.

Castor oil, per lb.	
Royalite, per gal., bulk	19½
Palacine	22½
Machine oil, per gal.	27½
Black oil, per gal.	16
Cylinder oil, Capital	52
Cylinder oil, Acme	39½
Standard cutting compound, per lb.	0 06
Lard oil, per gal.	\$2 60
Union thread cutting oil antiseptic	88
Acme cutting oil, antiseptic	37½
Imperial quenching oil	39½
Petroleum fuel oil, bbls. net	10¼

BELTING—NO. 1 OAK TANNED.

Extra heavy, single and double..	30%
Standard	30,10%
Cut leather lacing, No. 1	2 20
Leather in sides	1 75

TAPES.

Chesterman Metallic, 50 ft.	\$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun. Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

PLATING SUPPLIES.

Polishing wheels, felt	3 25
Polishing wheels, bull-neck..	2 00
Emery in kegs, American..	07
Pumice, ground	3½ to 05
Emerv glue	28 to 30
Tripoli composition	06 to 09
Crocus composition	08 to 10
Emery composition	08 to 09
Rouge, silver	35 to 50
Rouge, powder	30 to 45

Prices Per Lb.

ARTIFICIAL CORUNDUM

Grits, 6 to 70 inclusive	.08½
Grits, 80 and finer	.06

BRASS

Brass rods, base ½ in. to 1 in. rod	0 38
Brass sheets, 24 gauge and heavier, base	0 43

Brass tubing, seamless	0 46
Copper tubing, seamless	0 48

WASTE

White	Cts. per lb.
XXX Extra..19½	Atlas 17
Peerless 19	X Empire 15½
Grand 18	Ideal 16
Superior 18	X press 14
X L C R 17	

Colored.

Lion 15	Popular 12
Standard ...13½	Keen 10½
No. 1 13½	

Wool Packing.

Arrow 25	Anvil 15
Axle 20	Anchor 17

Washed Wipers.

Select White. 11	Dark colored. 09
Mixed colored 10	

This list subject to trade discount for quantity.

RUBBER BELTING.

Standard ...10%	Best grades ..15%
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ANODES.

Nickel	.58 to .65
Copper	.38 to .45
Tin	.70 to .70
Zinc	.18 to .18

Prices Per Lb.

COPPER PRODUCTS.

	Montreal	Toronto
Bars, ½ to 2 in.	42 50	43 00
Copper wire, list plus 10 ..		
Plain sheets, 14 oz., 14x60 in.	46 00	44 00
Copper sheet, tinned, 14x60, 14 oz.	48 00	48 00
Copper sheet, planished, 16 oz. base	46 00	45 00
Braziers, in sheets, 6x4 base	45 00	44 00

LEAD SHEETS.

	Montreal	Toronto
Sheets, 3 lbs. sq. ft.	\$13 25	\$13 25
Sheets, 3½ lbs. sq. ft.	13 25	13 25
Sheets, 4 to 6 lbs. sq. ft.	12 50	12 50
Cut sheets, ½c per lb. extra.		
Cut sheets to size, 1c per lb. extra.		

PLATING CHEMICALS.

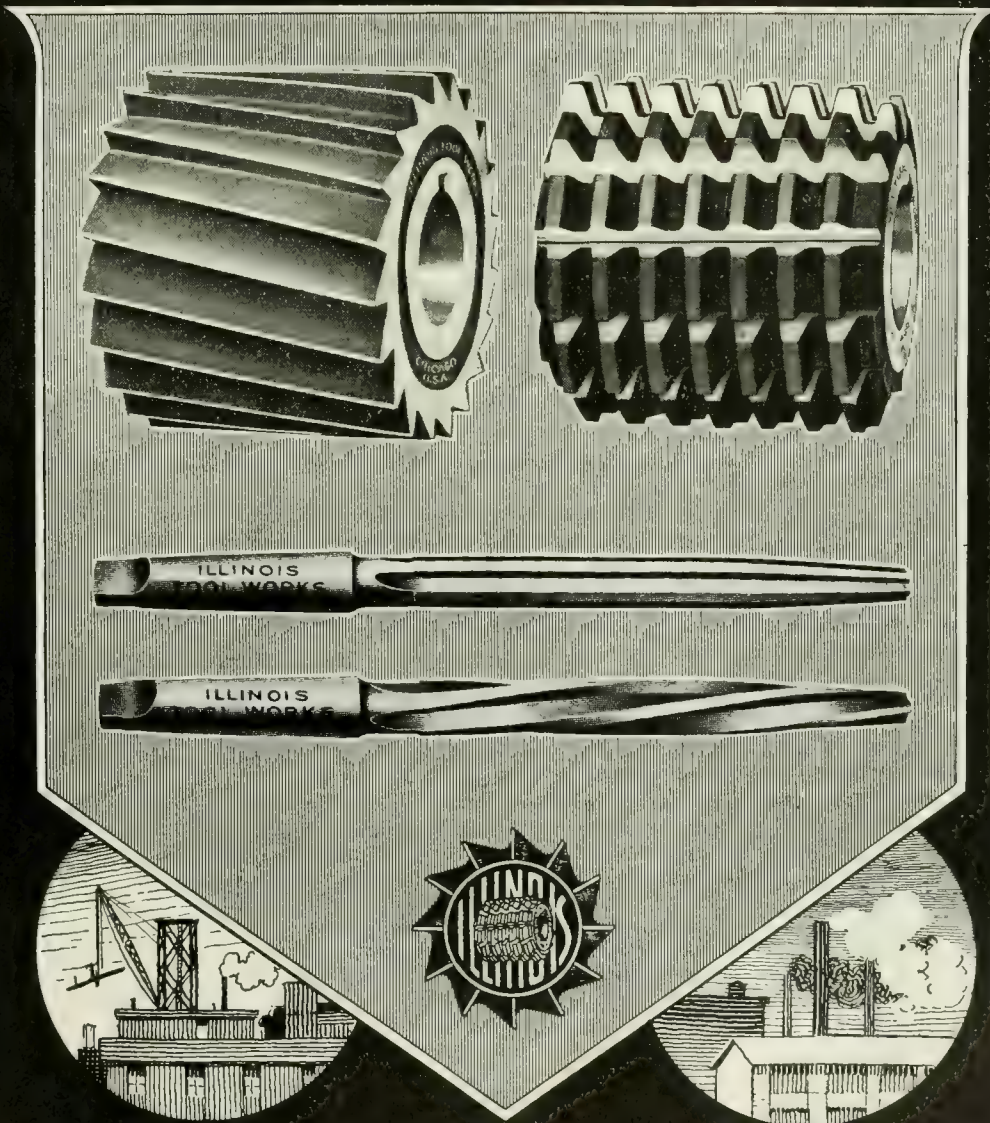
Acid, boracic	\$.25
Acid, hydrochloric	.06
Acid, nitric	.14
Acid, sulphuric	.06
Ammonia, aqua	.23
Ammonium carbonate	
Ammonium, chloride	.55
Ammonium hydrosulphuret	.30
Ammonium sulphate	.15
Arsenic, white	.27
Copper, carbonate, annhy	.50
Copper, sulphate	.22
Cobalt, sulphate	.20
Iron perchloride	.40
Lead acetate	.35
Nickel ammonium sulphate	.25
Nickel carbonate	.32
Nickel sulphate	.35
Potassium carbonate	1.80
Potassium sulphide (substitute)	2 25
Silver chloride (per oz.)	1.45
Silver nitrate (per oz.)	1.20
Sodium bisulphite	.15
Sodium carbonate crystals	.05
Sodium cyanide, 127-130%	.40
Sodium hydrate	.22
Sodium hyposulphite, per 100 lbs.	6.00
Sodium phosphate	.18
Tin chloride	1.75
Zinc chloride, C.P.	.80
Zinc sulphate	.15

Prices per lb. unless otherwise stated.

ILLINOIS

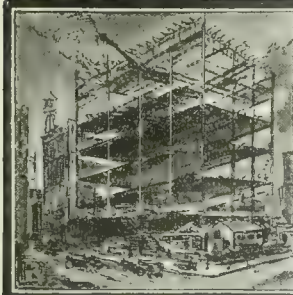
**CUTTERS
H O B S
REAMERS**

NONE BETTER CAN BE MADE



**ILLINOIS TOOL WORKS
CHICAGO**

Detroit Store, 997 Woodward Avenue. Represented by A. C. Towne & Co., Buffalo; Lewis G. Henes, Monadnock Building, San Francisco and Title Insurance Building, Los Angeles



INDUSTRIAL NEWS

NEW SHOPS, TENDERS AND CONTRACTS
PERSONAL AND TRADE NOTES



ENGINEERING

Guelph.—An industrial expansion of some magnitude has been proposed for Guelph, involving the building of a \$175,000 factory for the manufacture of rubber footwear by F. E. Partridge. A four-storey building of 200 by 80 feet will be erected, according to the plans drafted. The output of rubber footwear would amount to 5,000 pairs a day, and 500 persons, half of them women and girls, would be employed. The company with which Mr. Partridge is associated in the new venture, and which is distinct from the present Partridge Rubber Co., is asking the City of Guelph for a loan of \$50,000 at 4½ per cent., and it is proposed that a by-law to this effect shall be submitted to the ratepayers.

Toronto.—The Toronto Railway Company will spend \$800,000 on three and one-quarter miles of new track in the city this year. Notification has been received by the city that new tracks will be laid down as follows: Broadview from Queen to Danforth, 1 1-4 miles; on Gerrard from Broadview to Carlaw, about 3-4 mile; on Carlton from Sherbourne to Parliament, about 1-4 mile; on Spadina from Queen to College, about 5-8 mile, and on Front from Yonge to Simcoe, about 3-8 mile. The railway company will, on this work, spend about \$250,000. The city, which under the agreement, must lay the substructure for any new tracks, will have to provide the other amount of about \$580,000. Works Commissioner Harris has \$390,000 in the 1919 estimates for this work, and another \$190,000 is believed to be available.

Toronto.—A large deputation from Northern Ontario waited on the Ontario Government. The mission, as outlined by one of the speakers asked for the extension of the T. and N. O. on to the bay, the construction of branch lines to Gowganda and Kirkland Lake and the construction of trunk roads through the now partly developed areas. Instancing the difficulties and cost of communication, even to such a rich and well known property as the Miller Lake-O'Brien Mine, he said the supplies from Elk Lake out, cost \$1.25 per hundred pounds to transport. He spoke with a high note of eloquence when telling of the future ocean port at Moose Factory, which is ice free for five months of the year, and capable of being used as many months

as the ports of Montreal and Quebec. The T. and N. O. had brought great wealth to the province, and its extension to salt water would be equally profitable.

MARINE

Toronto.—The following notice of the opening of navigation for the present season appears in the papers:—Commencing Wednesday, March 5th, Str. "Macassa" will perform daily service (except Sunday), leaving Toronto at 5.00 p.m. and Hamilton at 9 a.m.

Brockville.—Capt. Lewis J. Estes, of Chippawa Bay, made his usual trip by motor boat from Chippawa Bay to Alexandria Bay yesterday, encountering

only a small amount of floating ice on the way. Capt. Estes has made this trip every week this winter. This is the first winter in the recollection of any of the present generation that the St. Lawrence, among the Thousand Islands, has not frozen over.

Ottawa.—If Canada is to get the full benefit of her growing merchant marine, the vessels must be manned by Canadians thoroughly trained in navigation, according to a report of the Department of Marine and Fisheries tabled in the House of Commons. Where Canadians are not available. British or American seamen should be used, in order that a common language might be used by both officers and crews.

Ottawa.—In the House of Commons.

TRACTOR MAKERS FIND IT HARD TO COMPETE FOR BUSINESS NOW

ON a statement given to the "Brantford Expositor" by John Muir, president of the Goold, Shapley & Muir Co., the point is made that the outlook for tractor makers in Canada is none too bright under existing tariff regulations. The Brantford paper says:

Asked if the Goold, Shapley and Muir Company were competing successfully with American tractor manufacturers, in view of the fact that the company was shipping tractors to the West, Mr. John Muir stated to "The Expositor" that it was either a case of compete or quit the business altogether. The margin of profit on tractors being sold was reduced to such an extent that it was most discouraging on a new line of industry which doubtless had a wonderful period of expansion before it. In fact, the removal of the duty on tractors was characterized by Mr. Muir as 'one of the rawest deals ever put over,' and was something to entirely discourage development of the industry. He gave several reasons therefor.

It was only recently that raw materials could be secured from the United States and during the embargo on the export of raw materials from the U. S., the Canadian concerns manufacturing tractors had to secure their steel and iron in Canada at a greatly advanced price. They were now able to secure raw materials from the U. S., and the increase in cost was a matter of freight

charges. In the Western States there was an important group of big manufacturers all with their eye on the Canadian West. They could sell more cheaply to a foreign country than in their own because it was policy, and because they sold outright. On the other hand, the Canadian manufacturers had to erect expensive warehouses in the West and send out travellers. The Americans merely sold their machines to jobbers who financed the business and despatched the money to the United States.

As to the cost of labor, Mr. Muir said that it was higher here than in Wisconsin where the motors for the G. S. and M. tractor were made. Asked as to what protection the industry should have, Mr. Muir stated that 20 per cent. or even 15 per cent. might be considered reasonable. It had been 27½ per cent. Why a farmer should be taxed on the shoes he wore, his hat, clothing, and everything else except implements, was something he could not understand. It was discrimination against an increasingly important industry in this country. 'When the Mackenzie Government went down before the National Policy, it was a matter of a revenue tariff for the country of 17½ per cent,' said Mr. Muir. 'Was such a revenue tariff not required at this period of reconstruction in Canada?' he asked. 'A revenue tariff was needed every bit as much now as then.'



Dominion Rubber System Belting is Better Belting for Every Purpose

There is yet to be found a process, condition, use or industry in which belting is required that the Dominion Rubber System's belting engineers have not successfully and efficiently served with some type of our Belting.

If you have a problem for which there is no parallel, our technical experts will undertake to solve it without charge, and produce, if necessary, a special type of belt to satisfactorily meet your requirements.

Nearly every factory, mine, quarry, paper or flour mill, grain elevator or railway shop, is using our Belting as a satisfactory part of its equipment—some of the largest users specify it exclusively.

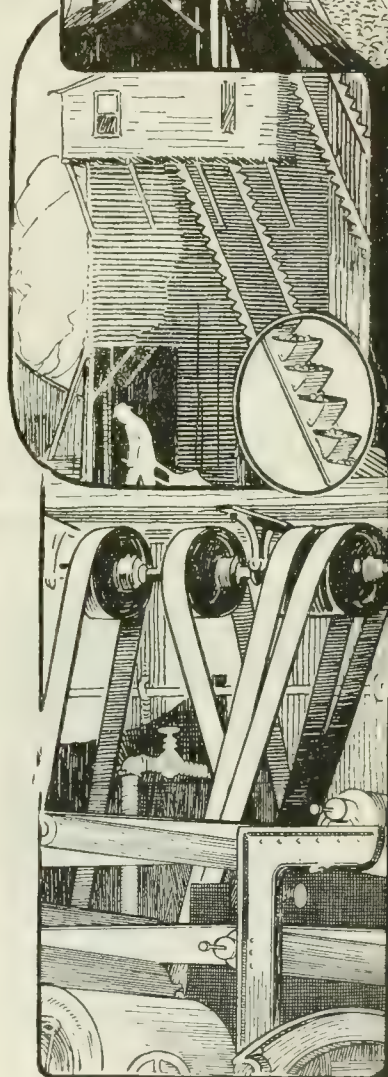
Our **Dominion Friction Surface Belting** will out-serve, at lower cost per horse-power, any belt made—because it is built up to the highest quality standard—by the oldest, largest and most highly specialized rubber organization in Canada.

An important factor in the service of Dominion Rubber System Belting is in placing the right type of belt where it will produce maximum efficiency—this is primarily due to our Dominion-wide service branches, through which the free advice of our belting engineers is available to every user of belting.

As one of these service branches is within 'phone distance of you, put it up to our experts to get you out of any difficulty that concerns belting.

Service Branches

Halifax, St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, London, Kitchener, North Bay, Fort William, Winnipeg, Brandon, Regina, Saskatoon, Edmonton, Calgary, Lethbridge, Vancouver, Victoria.



J. E. Armstrong, of Lambton, introduced a Bill to place shipping on Canadian inland waters under the jurisdiction of the Railway Commission. At the present time, Mr. Armstrong said, these boats are allowed to charge any rates they pleased and to call at any place they liked. Canada had spent about three hundred and fifty million dollars on her waterways, and by lack of control over shipping on her inland waterways is placed in a somewhat humiliating position. The bill was read a first time.

London.—There are further indications of a favorable turn in the labor situation. The Thames ship repairers, who are on strike, held a mass meeting and decided to resume work and to negotiate afterwards on the question of an increased wage. The shipyard platers employed by the North Ireland Shipbuilding Company at Londonderry, who had been striking since January 27, demanding a 44-hour week, also returned to work pending a settlement of the question of hours. The Tyne shipyard workers, who had been striking for eight weeks, also returned to work in goodly numbers.

London.—Mark Workman, president of the Dominion Steel and Coal Company, and E. M. Macdonald, legal representative of the company, have made strong representations to the Ministry of Shipping for the release of the company's ships requisitioned by the British

Government. Mr. Workman pointed out that previous to being requisitioned, the company's ships had carried two million tons of coal up the St. Lawrence from the Nova Scotia mines. Since the ships were taken over the coal trade had fallen to 70,000 tons, and the United States had captured the market and doubled the price to Montreal consumers.

MUNICIPAL

Guelph.—Plans have been prepared by a Toronto architect for a four-roomed public school, to be erected on Exhibition street, in St. David's Ward, to cost about \$5000. Provision is made in the plans for a further extension of the building to a 12-room school without any tearing down of walls or other expense, should the board see fit to do so in the future.

TENDERS

Ottawa.—Sealed tenders will be received until 12 o'clock noon, Wednesday, March 19, 1919, for the construction of Educational Block, R.M.C., Kingston, Ont. Plans and specification can be seen and forms of tender obtained at the offices of the Chief Architect, Department of Public Works, Ottawa, the Overseer of Dominion Bldgs., Central Post Office, Montreal; Superintendent, Dominion Bldgs., Postal Station "F," Toronto, and of the Resident Architect, Kingston, Ont.

TRADE GOSSIP

For French Business.—A Mitchell firm has received a big order for cement mixers from the French Government and their employees are working overtime to catch up with the work.

Declared Dividend.—Dominion Steel Corporation declared 1½ per cent., payable April 1 to shareholders of March 5. Dominion Iron and Steel preferred declared 1¼ per cent., payable April 1 to shareholders of March 15.

Moved Office.—Morse Chain Co., Ithaca, N.Y., announce that they are advised by P. A. Morse, of the Morse Engineering Co., their Western representatives. St. Louis, Mo., that the Kansas City offices have been removed from the old quarters in the R. A. Long Building, to more commodious rooms, Suite 211-212 Finance Building, where Mr. W. V. Warner, the office district manager will greet their friends.

Negotiations Are On.—Sir John Gibson confirmed the report that negotiations for the purchase of the National Steel Car Co. by the American Car and Foundry Co., were in progress, but he declined to say anything further. It is rumored that under the terms of sale proposed, the American company will pay \$114 for the preferred stock and \$25 for the common, but that the payment will be spread over a term of years.

Paris.—The insurance underwriters have Paris in class "D" for the first time in the history of the town. The last inspection was held in December 17, and

the following is what the underwriters require: "The installation of another pump of 600,000 gallons' capacity, and that the reservoir be just about doubled in size; where the water mains cross the river they should be duplicated to insure service in case one should be broken; an additional eight-inch main to be run from the reservoir.

The Price Doubles.—The first of a number of new switch engines ordered by the G.T.R. for Toronto yards has been in service and given entire satisfaction. The engines to-day cost the Grand Trunk something like \$45,000; previous to the war the same engine could be purchased for from \$22,000 to \$25,000. "The increase," said an official, "was brought about by the scarcity of steel and labor in war times, so that a locomotive to-day is double the price it was five years ago."

Made Big Profits.—The annual report of Penmans Limited, for the fiscal year 1918, shows that the company concluded the period with record profits. After all deductions have been made the report indicated a balance at credit of profit and loss account of \$850,167, as compared with \$807,868 in 1917, and of \$672,493 in 1916. The surplus is equivalent to 39.5 per cent. on the common stock outstanding of \$2,150,000, as compared with 35.4 per cent. in 1917 and 26.7 per cent. in 1916. Gross profits amounted to \$1,953,643, as against \$1,671,105 in 1917, an increase of \$282,538.

Canada Forgings Directors.—At the annual meeting of Canada Foundries and Forgings, Limited, the officials of the company selected were as follows: president, W. M. Wier, Montreal; vice-president, J. Gill Gardner, Brockville; secretary-treasurer, J. H. A. Briggs, Brockville. In addition to the above the following directors were appointed: T. J. Dillon, Welland; Hon. G. P. Graham, Brockville; Lieut.-Col. Monsarratt, Ottawa; Lieut.-Col. Smith, Montreal; H. Howser, Toronto; H. Bertram, Dundas, and Hon. W. J. Shaughnessy, Montreal.

Want Protection.—Although a soda ash and other by-products' plant has been erected at Amherstburg at a cost of more than a million dollars, by the Brunell-Mond Company, a subsidiary of the Solway Process Company of Detroit, there will be no attempt made at starting operations until some assurance is received from the Government that adequate tariff protection will be extended to the industry. At present, soda ash comes into Canada duty free, except for the war tax of 7½ per cent. The local Chamber of Commerce has taken the matter up.

Steel Prices are Holding.—Statements by Judge Elbert H. Gary, chairman of the board of the United States Steel Corporation, that reports of unemployment have been exaggerated and that conditions generally are far better than has been believed by the public at large, are reassuring to those who have maintained all along that industrial good fortune was in store for the country. A

STARTING OUT TO MAKE NEW LINES

Gray Ball Bearing and Manufacturing Co. Will Shortly be Starting Operations

The Gray Manufacturing and Machine Co., Toronto, are adding new lines to their industry and will in a short time be in the market with them. Speaking of the changes, Alex. Gray, president of the concern, stated to CANADIAN MACHINERY:

"We are at the present time reorganizing our business and are commencing the manufacture of ball bearings, heavy stamping and automobile parts. Our ball bearings will be for transmission line shafting and countershafts, and also thrust and other types of bearings for automobiles and machines.

"Our authorized capital has been increased to \$150,000 to take care of this, and the firm name will shortly be changed to the "Gray Ball Bearing and Manufacturing Co., Ltd."

"We have now associated with us as directors in our company, John Reekie, who will have charge of sales and W. J. McCallum as chief engineer and works manager. Mr. Reekie and Mr. McCallum have for some years been in connection with the Chapman Double Ball Bearing Co. of this city, and we feel that with their addition to our organization we will be in a position to energetically push the manufacture and sale of our new lines with great confidence in the future of our business."

The REGO

Welding and Cutting Torches

Save You Money

Every Day---Look 

In the REGO the 25 cubic feet of oxygen which is saved is taken from the atmosphere, and of course costs nothing, whereas in less efficient Torches this amount of oxygen is required from the Tank, which costs money. So, use the REGO and save at least \$3.00 per day.

Other Torches require per hour 125 cubic feet of Oxygen per 100 cubic feet of Acetylene; *The REGO* No. 10 requires *only* 100 cubic feet of Oxygen per 100 cubic feet of Acetylene---

Saving per Hour . . . 25 cubic feet.

Price per cubic foot 2 cents.

Saving in cost per hr. 50 cents.
6 hours.

Saving per Day . . . \$3.00

The Principle of the REGO

The REGO Torches are not an improvement on existing patterns, but are designed entirely on a new principle, which incorporates the following features:

The REGO is technically designed. It was built around certain established oxy-acetylene facts, the importance of which previous constructors had not recognized.

No oxy-acetylene authority has disputed or can dispute the correctness of the principle of REGO torches.

The REGO saves oxygen—lots of it—it absolutely eliminates the time-wasting flashback, and it uses lower pressures than any torch heretofore constructed.

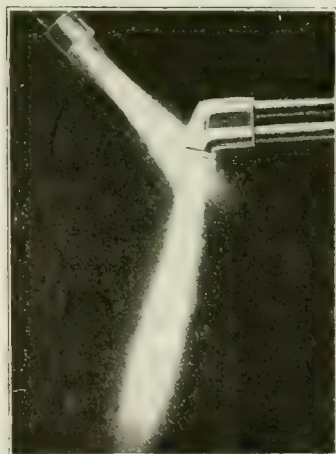
Its mechanical features also strongly appeal to the practical welder. The gases mix

in the tip, and this tip is a nickel copper alloy. The seat is a broad-angle cone, made tight to the head by means of a union nut threaded to the outside of the head. A tight joint is always maintained without hazard of splitting or distorting the head—there is no wedge principle in this construction.

A SUPERIOR WELD

The absence in the REGO of excess of oxygen to get through the flame produces a steel weld remarkably free from oxides.

—NO FLASH—



Air-gas preheating torch flame playing on mixing chamber of welding torch until tip and nut are at a red heat.



Drilling hole through 5-inch axle. Tip in hole. No escape for sparks or heat except against tip.

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significant statement made by the head of the Steel Corporation, who has come to be the spokesman of the industry, was that prices were being well maintained. Certainly if prices are being maintained by a wholesome amount of new orders prices will not be arbitrarily cut, at least for the immediate future.

Fredericton, N.B.—Practically all the coal mines in the Grand Lake mining area have been closed because of the unsatisfactory conditions of the coal market. Some 500 or more men have been thrown out of employment in the vicinity of Minto alone, and the only mines that are now running are those of the Minto Coal Company. Coal which last year at this time was difficult to get at \$6 per ton at the mines is now offered at \$3.75, and not finding ready sale even at that price. So serious has the situation at the Grand Lake mines become that this morning Premier Foster announced that the Provincial Government had wired to Hon. Dr. E. A. Smith, Minister of Lands and Mines, who is at Ottawa, to place the matter before the Federal Government.

At the Lyons Fair.—A despatch, speaking of the Canadian Fair at Lyons, France, says: "The Canadian section includes fifty-three firms, the Canadian National Railways, Departments of Mines, Agriculture, Forestry, and the Canadian Pacific Railway, with all Canadian industries represented. The Paris edition of the 'New York Herald' says the Canadian exhibits are a striking feature of the fair, constituting a complete display of Canada's industrial and commercial products. The Mayor of Lyons and the management of the fair will be the guests of Canada at lunch, over which Sir George Foster will preside, accompanied by M. Phillippe Roy, Canadian Commissioner to France. Mr. Lloyd Harris, of the Canadian Trade Mission, and a party of forty-six allied press representatives at the Peace Conference, will be guests of the fair on Thursday next. The British participation at the Lyons Fair has advanced from fourteen exhibits in the first year to more than four hundred and fifty, including the Canadian and Australian sections."

Closed Plant Again.—An item in the Redcliff (Alta.) "Review" states: "The rejoicing over the news that the Rolling Mills was to open up again this morning was short lived. The mill opened as arranged all right, but when the men arrived and started to work they refused to carry out the wishes of the management regarding the engaging and placing of the men. This meant that the management of the plant was practically taken out of the hands of the manager and intimated that the men intended to run it to suit themselves. Of course this procedure could not be tolerated in any concern and the result was that instructions were given to have the works shut down again immediately. In conversation with Manager Perrins this morning he informed us that although there was no immediate demand for materials, he

had decided to open up for a time at least in order to provide employment for a number of men who were now idle and thus help to bridge over the period between war and peace time conditions. It was the intention to start in on the muck mill to-day and on the finishing mills on Monday. However, since conditions have turned out as above mentioned, these plans have been upset and we have been unable to get any definite date as to when business will be resumed."

MADE IN CANADA AUTOMOBILE IS PROGRAMME FOR PEACE TRADE.

ANNOUNCEMENT has been made by T. A. Russell, concerning the reconstruction plans of the Russell Motor Car Co. These involve the construction of a made-in-Canada automobile by the Willys-Overland, Limited, and the reorganization of that industry. During the war passenger cars were assembled at the West Toronto plant of the Willys-Overland Company, and attention was concentrated on the manufacture of munitions. The machine tool equipment of the plant was wholly devoted to war work, including the manufacture of airplane engines. A peace program has now been developed that includes the manufacture of two models of automobiles, a popular-priced light four, equipped with electric lights and self-starter, and a higher-priced car, in which the Knight engine will be installed. Work will be commenced on the light four model almost immediately, and it is probable that it will be on the market by midsummer.

Will Make Gramophone Motors

The reconstruction plans of the Russell Motor Car Company as well have been brought to completion, at least in part. The headquarters of the automobile industry will be centred in the Willys-Overland plant, and the forward step marks the union of two organizations that were successful in two of the most intricate lines of war industry, namely, the manufacture of fuse parts and airplane engines. At the King street plant the manufacture of gramophone motors will be entered upon. This is an important line of manufacture which has not previously been established in Canada. Preliminary work has already been finished in connection with these motors and after successful tests were made recently, the company is already entering on quantity production, which, it is expected, will be at the rate of 1,000 a month. This industry will supply an important part for Canadian-made gramophones, and the market is capable of great extension. Other lines of production at the Russell plant on King street will include gramophone and piano hardware, spark plugs and bicycle chains. None of the above articles has previously been manufactured in Canada, and the new ventures are more noteworthy for the reason that the commodities that will

CATALOGUES

Green's Economizer Limited, Toronto, have issued a 64-page catalogue on "Green's Economizer," which is descriptive in a very able manner of the use of an economizer in the power plant. The historical aspect of the subject is well dealt with, and the publication forms a text-book for those interested in the subject of fuel conservation.

The Aberthaw Construction Co., Bos-

be turned out will widen the manufacturing field in Canada and will not be in competition with the products of existing industries.

The other products of the metals and stampings plant will comprise small stampings, including parts of electrical equipment and parts of safety razors that will be supplied to manufacturers.

Larger Bicycle Production

In connection with the Canada Cycle & Motor Co., Mr. Russell stated that production is being maintained at full capacity, and that there is a large market for the products of this industry which could not be taken advantage of during the war on account of other requirements. A representative will leave within the next month to secure business offering in Australia, which has been a profitable market in the past for bicycles, and which is believed to offer greater possibilities in the future.

The Willys-Overland plant will employ over 1,000 men, and will provide employment for practically all the executive and sales staff of this concern. Before and during the war some five models of assembled cars were handled. The fact that production will be confined to two models is significant of the policy of the company. The larger stampings will be secured in Canada from a company specializing in this department. This will mean that all the parts of the cars to be manufactured at the Willys-Overland plant will be made in Canada, with the possible exception of the springs.

Company Official Changes

Changes in the company include the retirement of Mr. F. J. Sleight, who has been general manager of the company, and who is leaving Canada about the first of May to take up important duties in connection with the Willys interests in the United States. Mr. Willys is retiring from the presidency of the Canadian company, and will become chairman of the Board of Directors. T. A. Russell, formerly vice-president of the company, will become president. It will require some months for the installation of machinery before the company can enter upon full production. The capital stock of Willys-Overland, Limited, is being increased considerably.

ton, Mass., have issued an exceedingly attractive pamphlet descriptive of water front construction. The subject matter of this publication is descriptive of some of the many water-front constructions undertaken by this firm, and includes everything, from the building of a single dock to the building of a marine railway or the erection of a complete shipbuilding plant.

The Jones Superior Machine Co., Chicago, Ill., are issuing a bulletin No. 48, which is descriptive of the Superior automatic gear hobbing machine. The method of operation is described in detail, outlined by drawings and half-tone engravings combined to give one a good idea as to the detailed design of the machine. The Oliver Machinery Co., Grand Rapids, Mich., has issued an attractive catalogue describing the Universal Wood Milling Machine, which is especially adapted to industrial engineering plants, railroad shops, shipyards, arsenals, and all manufacturers using woodworking machinery. This machine fills the place in the woodworking industry that the milling machine does for the metal trade.

ANNUAL MEETING OF SERVICE GUILD

Nautical Schools to be Established at Various Points for Marine Men

The second annual meeting of the Canadian Merchant Service Guild was held in Toronto recently with delegates present from all the principal ports in the Dominion. The business of the past year was reviewed and found to be most satisfactory, both in membership and financial standing. The membership now exceeds six hundred, although the Guild is only one year old, having been organized in the City of Toronto on February 28, 1918.

The Canadian Merchant Service Guild works on similar lines to the Imperial Merchant Service Guild of the British Isles, but is independent of the latter, its aims and objects are to draw into closer unity those who are carrying on our merchant service and to set forth the important position our mercantile marine profession must assume if the power and prestige of the Dominion of Canada is to be upheld throughout the world. Also to build up the integrity of the profession so that the future safety and prosperity of the trade and commerce with the outside world may be assured. The Guild at present has a nautical school operating in Collingwood, Ont., and intend establishing in the near future other schools throughout the Do-

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PATENTS FOR SALE

Two Canadian Patented Steam Specialties for sale; one Steam Trap, Patent Number 187215, and one Steam Separator, Patent Number 183340.

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You Know How Greatly it Increased Production

You know how it proved to be without equal for both first and second operation punches—how, in both Canadian and American shell plants, this heat-treated ready-for-use steel enabled each punch to turn out over 2,000 shells.

Hawkridge Brothers' steel for every commercial requirement is just such production-increasing steel as proved this "Hawk" D. Chrome Vanadium. We make

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Description

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'Barnes-Made' Springs

are unusual in
service and wear.

They are the result of sixty years' experience, unsurpassed equipment and highly skilled workmanship.

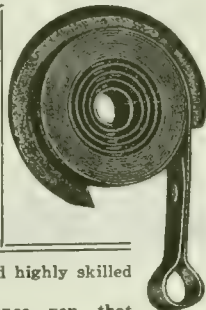
A trial will convince you that "Barnes-Made" Springs are the best buy.

Established 1857.

THE WALLACE BARNES COMPANY

218 South St., Bristol, Ct., U. S. A.

Man'rs of "Barnes-made" Products
Springs, Screw Machine Products, Cold Rolled Steel and Wire



gaged in their profession, but any British subject may become an associate member. Capt. W. W. Inkster, of Collingwood, Ont., has been engaged as secretary-treasurer, and will devote his entire time in the interests of the Guild. The counsel for the Guild is John Birnie, K.C., of Collingwood. The Guild will issue a magazine monthly.

THE REDFIELD PROPOSAL

SO MUCH is said of Secretary Redfield's proposition to readjust prices of basic materials in the United States, that CANADIAN MACHINERY publishes the remedy he suggests:

1. It is believed that a remedy for these conditions can be had by a comparatively simple programme. As the President has approved my appointing a board which will make a study of the subject and take action thereon, and as it will be made plain that the Department of Commerce and its board has the support of the President, there can be no doubt that industry generally will be glad to co-operate with the board in an endeavor to arrive at a solution of the difficulties.

2. Therefore, one of the first steps

which the board should take would be to call into consultation and conference the leaders of industry in such numbers and by such groups as it may be felt is wise. Probably the first of these conferences should be with representatives of industries producing basic materials, such as iron, steel, lumber, textiles, cement, copper, brick, and other construction materials and from time to time thereafter such others as may be deemed proper. It is believed however, that industries dealing in finished products will be able to largely (if not entirely) adjust their prices in line with the above policy without material aid from the committee.

3. At such conferences the general situation or conditions outlined above, and as they may change up to the time of the conference, should be considered and carefully understood, and the above-mentioned principles which ought to apply and govern the solution of the problems should also be fully understood and appreciated. It is believed that these principles and views will be readily accepted by the great majority of those called into conference, and further, that if any of those who come into conference question these principles and

FINANCE



DEPARTMENT

DOMINION INCOME WAR TAX ACT

TO WHOM APPLICABLE.

Every person who in 1918 resided or ordinarily resided in Canada or was employed in Canada or carried on business in Canada including corporations and joint stock companies

WHO SHOULD FILE RETURNS.

1. Every unmarried person or widow or widower, without dependent children under twenty-one years of age, who during calendar year 1918 received or earned \$1,000 or more.
2. All other individuals who during calendar year 1918 received or earned \$2,000 or more.
3. Every corporation and joint stock company whose profits exceeded \$3,000, during the fiscal year ended in 1918

FORMS TO BE FILLED IN AND FILED

- FORM T1. By individuals, other than farmers and ranchers
FORM T1A. By farmers and ranchers
FORM T2. By corporations and joint stock companies.
FORM T3. By trustees, executors, administrators of estates and assignees
FORM T4. By employers to make return of the names of all directors, officials, agents or other employees to whom was paid \$1,000 or more in salaries, bonuses, commission or other remuneration during the calendar year 1918
FORM T5. By corporations, joint stock companies, associations and syndicates to make return of all dividends and bonuses paid to shareholders and members during 1918. Individuals comprising partnerships must file returns in their individual capacity.

GENERAL INFORMATION.

All returns must be filed IN DUPLICATE

Forms may be obtained from the Inspectors and Assistant Inspectors of Taxation and from the Postmasters at all leading centres.

Returns should be filed immediately

Postage must be prepaid on letters and other documents forwarded by mail to Inspectors of Taxation

Address of Inspector of Taxation for this District

TORONTO DISTRICT.

Inspector of Taxation,

59 Victoria Street, TORONTO, Ont

views, a discussion thereof in the conference will, without any considerable delay, lead to a unanimous acceptance thereof.

4. In addition to giving assistance to industry in reaching satisfactory price bases the board ought to be able to give valuable advice in regard to such questions as the disposal of surplus war materials, it being desirable to accomplish this in such a way as to have as little detrimental effect as possible upon private industrial activities.

It will be the endeavor of the Board to act promptly by consulting and interchanging views with these representatives of industry in the fullest and freest manner possible, with a view to aiding and assisting industry in general to resume activities to the fullest practicable extent. The immediate object is to bring about such reduced prices as will bring the buying power of the Government itself, including the railroads, telephones, and telegraphs, into action and make it possible for the Government to state that it is willing to be a buyer for its needs at the reduced prices. If these conferences result in such an understanding on the part of the Government with respect to the important basic industries concerning proper prices and bases for prices at which purchases may be made by it, and these are approved by the board, it is believed that upon announcement thereof to the country in general the public will feel justified in promptly beginning a programme of extensive buying.

Such a procedure will in substance establish immediately a basis upon which to resume activities, and in this way the law of supply and demand will be enabled to come into play, and from that time forward it will control the changes and readjustments in selling prices of materials and the trend of prices, it is believed, will be upward and not downward.

WILLIAM C. REDFIELD,
Secretary of Commerce.

GOOD ENGINEERS AND FIREMEN

It is hard to exaggerate the importance of having good men in charge of the boiler room. The unskilled man, usually proves expensive. He is wasteful of fuel and of other supplies,—not intentionally, but because he is careless or unskilled. There is also a large chance that the inferior man will damage the boilers and machinery under his care, by incompetence or neglect; and many costly boiler explosions have resulted from failure to do something or other in the right way, or at the right time. Sometimes the authority to hire the men, or to determine what shall be paid to them, rests with the wrong person,—with a person, namely, who does not appreciate that while a clerk can usually waste nothing but his own time, a boiler-room attendant can not only waste tons of coal in addition, but can also endanger the whole plant. A mistake of this kind should be promptly rectified, by giving more authority to some one who has a better understanding of the boiler-room problem.

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ONE 3 16" ADT. MODEL AUTOMATIC WIRE straightener and cutting machine arranged to cut a maximum of 10 feet. E. M. Bride, 113 4th Ave. East, Calgary, Alberta. (c11m)

2 FROG AND SWITCH PLANERS. 1 RAIL and frog filler multiple spindle borer. Box 557, Canadian Machinery. (c10m)

ONE SECOND-HAND JENCKES CORLISS ENGINE 12" x 30". Cut, description and price on application to Canadian Ingersoll-Rand Co., Limited, Toronto, Ont. (c15m)

ONE SPINDLE, GRIDLEY, AUTOMATIC, 7 1/2-inch capacity, second-hand, perfect condition, slightly used. Ontario Metal Products Company, Limited. (c15m)

ONE NO. 3H LeBLOND UNIVERSAL MILLER. One LeBlond heavy duty 21" lathe. One LeBlond heavy duty 17" lathe. All of above slightly used and as good as new. Reliance Motor & Tool Co., Ltd., Toronto. (c13m)

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1 STEAM HOIST, 7 x 12, BEATTY DOUBLE drum, complete with boiler 100 lbs. pressure. 1 Vertical boiler with all fittings, 25 H.P., 100 lbs. 1 Air compressor, belt driven, Chicago pneumatic, 12 x 10, 300 cu. ft., at 100 lbs. 2 Cement guns, complete with all accessories. 1 McLaughlin auto truck, new stake body. 2 Air compressors, belt driven, Bury, 650 cu. ft., at 30 lbs. Burns & Roberts, Toronto. (c12m)

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Two 3 x 36" geared feed Turret Chucking machines with 3" collet chucks, about 3 1/2 years old. Price, each \$700.00.

Three 3 x 36" Friction Feed Chucking machines without Collet Chucks, complete with Friction Counter Shafts, about 6 or 7 years old. Price, each \$300.00.

The above are Jones & Lamson make.

Three 8 x 8" Open Type Single Horizontal Belt Driven Air Compressors, with unloaders. Capacity 75 cubic feet air per minute. Each \$400.00. Extra for Air Tanks if required.

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One 2" Engine Lathe x 10', Flather. Price, \$350.00.

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Wanted immediately. Heavy Duty Lathe, new or used, good condition, ranging from 40" to 45". Swing, about 25 ft. between centers. Arranged for Motor Drive.

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14—16" x 6' South Bend double back geared lathes.
5—16" x 6' South Bend single back geared lathes.
1—10" x 36" Norton grinder.
1—No. 2 Ford-Smith plain miller.
1—16" x 22" x 8' Sebastian gap lathe.
50 and 75 H.P. Motors.
1—340 cubic ft. Rand Compressor, Aftercooler and Receiver, belt, and 5" pipe.
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12—Racine hack saws.

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In first-class condition,
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Belt driven, 14" by 9" by 12", with automatic unloader. Capacity 470 cu. ft. per min. Vertical Air Receiver, 42" by 10 ft. 75 H.P. Crocker-Wheeler Induction Motor, 550 volt, 25 cycle, 750 r.p.m.

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1 "Bullard" lathe 20x12'-0"

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- 2' FOSDICK National pattern.
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- No. 2 BAKER Keyseating machine.
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 No. 4—B. & S. Plain Miller
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 No. 3—Cincinnati Universal Miller
 5—No. 0 Steptoe Hand Millers
 13" x 5' 6" New Carroll-Jamieson Quick-Change Lathe
 14" x 6' New Carroll-Jamieson Quick-Change Lathe
 15" x 6' New Sidney D.B.G. Quick-Change Lathe, swing 17"
 15" x 8' New Sidney D.B.G. Quick-Change Lathe, swing 17"
 17" x 8' New National Quick-Change Lathe
 3 17" x 8' New Sidney D.B.G. Quick-Change Lathe, swing 19"
 17" x 10' New Sidney D.B.G. Quick-Change Lathe, swing 19"
 18" x 24" New Rahn Larmon Lathe, D.B.G. Quick-Change
 19" x 10' New Sidney D.B.G. Quick-Change Lathe, swing 21"
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 33" x 14' Putnam, arranged for Motor Drive
 6' Western Radial Drill
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 100-lb. New Little Giant Hammer
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 30-ton Watson & Stillman Hydraulic Press

FRANK TOOMEY INC.

127 North Third Street

PHILADELPHIA, PA.

IN THE

Financial Post THIS WEEK

STEEL REDUCTIONS ON THE WAY?

"Rumor has it, according to the Pittsburgh correspondent of the FINANCIAL POST, that the steel producers have about made up their minds that substantial reductions, not like those of say \$4 or \$5 a ton last December, will have to be made, and should be made before the regular period of spring buying. It appears to be a common opinion that the lead in making reductions should be taken by one of the independents rather than by the Steel Corporation, and the prediction is that reductions will be announced the middle or latter part of March. One guesser makes it that the reduction on merchant steel bars will be \$14 a net ton, from \$2.70 to \$2.00, but that represents the extreme of the guesses."

Besides the important article from which the above quotation is made, THE POST this week deals with the following amongst

OTHER SUBJECTS OF INTEREST

- Dominion and Scotia Steel at Cross Purposes
 Stock Markets Discounting a Business Improvement
 New Managers for Polson's Iron Works
 Forgings Profits Showed Drop of Nearly \$90,000
 St. John People Stirred by Talk on Bolshevism
 Steamships in Strong Position, 21 Per Cent. on Common
 Fourteen Banks Close Up Doors in Minnesota
 Montreal Cottons Earned 14 Per Cent. on Common Stock
 Bankers Urged to Contend With Foreign Problem
 Railroad Income and Expense Under U.S. Government
 Some Problems in Price Readjustment

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One Positive Pressure Blower good for two-pound pressure, equal to No. 30 Connersville.

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One Gleason Iron Planer 36" by 36" by 10 ft., in good condition. Price, \$2,000.

One 4 ft. American Radial Drill in fine condition. Price \$1,800.

One 16" by 24" B. G. Butler Shaper in good condition. Price, \$500.

One Heavy Duty Single Purpose Horizontal Boring Mill, suitable for lathe and pump manufacturing. Price, \$500.

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3	H.P.,	550	VOLTS,	1,200	R.P.M.	1
2	H.P.,	550	VOLTS,	1,200	R.P.M.	1

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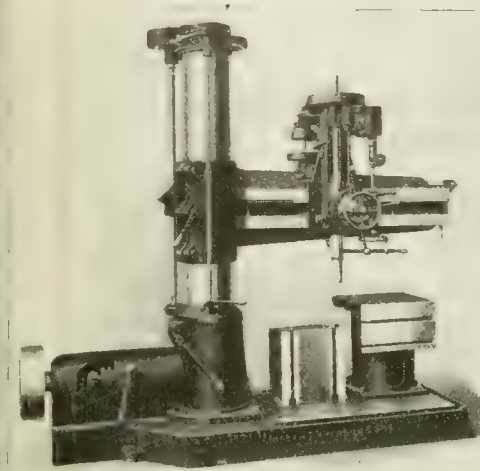
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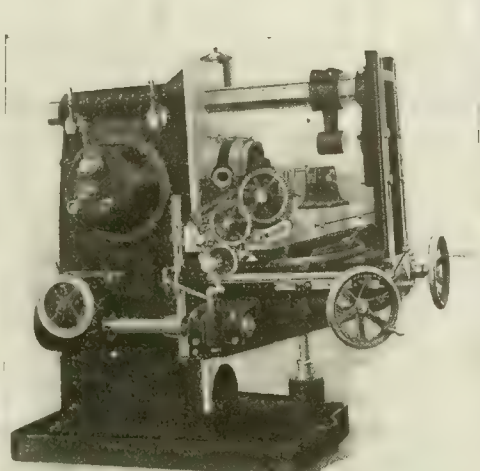
427 Queen St. W. - Toronto, Canada

Metal Working Machinery

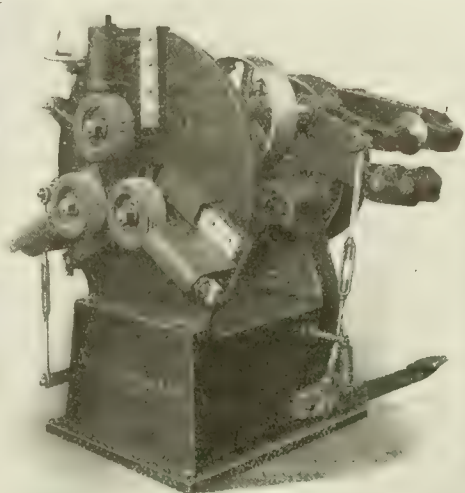
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Ryerson 4 Plain Radial Drilling Machine with gear No. 3 box drive.



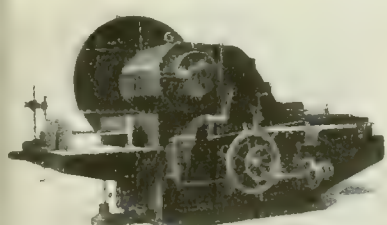
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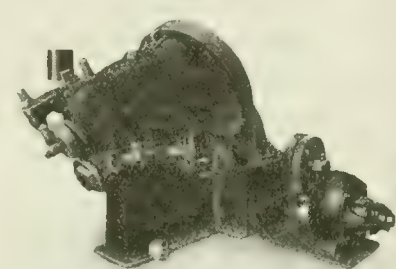
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- 1 New Sidney Lathe—Double back gears; quick change gears; max. distance between centers 11'; max. swing over shears 27½"; taper attachment.
- 2 Hamilton, O. Lathes—Swing over shears, 20" and 21"; max. distance between centers 4' 4"; opened gears; double back gears; one has Independent chuck and one has one Independent and one Universal chuck; good condition.
- 1 Sebastian Lathe—Swing over shears, 15"; max. distance between centers, 5' 6"; opened gear; single back gear; one Universal chuck; fair condition.
- 1 Sebastian Lathe—Swing over shears, 15"; gap 2"; max. distance between centers, 3'; opened gear; single back gear; one Universal chuck; fair condition.
- 1 LeBlonde, H.D. Lathe—Swing over shears, 26"; max. distance between centers, 11'; opened gear; single back gear; fair condition.
- 1 C.M.C. Lathe—Swing over shears, 20"; max. distance between centers, 9' 6"; taper turning attachment; quick change gear; double back gear; one Independent chuck; good condition.
- 1 C.M.C. Lathe—Swing over shears, 18"; max. distance between centers, 3' 6"; taper turning attachment; double back gear; good condition.
- 4 C.M.C., H.D. Lathes—Swing over shears, 26"; max. distance between centers, 6'; two with and two without taper turning attachment; quick change gears; three with Independent chuck and one with Universal chuck. These lathes are new.
- 1 Gleason Lathe—Swing over shears, 24"; max. distance between centers, 3'; open geared; single back gear; fair condition.
- 1 Cisco Lathe—Swing over shears, 15"; max. distance between centers, 3'; quick change gear; single back gear; one Universal chuck; fair condition.
- 1 Barnes Lathe—Swing over shears, 18"; max. distance between centers, 5'; eight feed changes in apron of carriage; single back gear; one Universal chuck; good condition.
- 1 Hepburn Lathe—Swing over shears, 20"; max. distance between centers, 26"; good condition.
- 1 Bertram Lathe—Swing over shears, 26"; max. distance between centers, 8'; taper turning attachment; quick change gears; double back gears; one Independent chuck; good condition.
- 1 Pond Lathe—Swing over shears, 38"; max. distance between centers, 9'; taper turning attachment; quick change gears; triple back gears; good condition.
- 1 LeBlonde H.D. Lathe—Swing over shears, 30"; max. distance between centers, 16'; quick change gears; double back gears; good condition.
- 1 LeBlonde H.D. Lathe—Swing over shears, 26"; max. distance between centers, 12'; quick change gears; double back gears; good condition.
- 1 LeBlonde H.D. Lathe—Swing over shears, 26"; max. distance between centers, 4'; taper turning attachment; quick change gears; double back gears; one Universal and one Independent chuck; very good condition.
- 1 LeBlonde H.D. Lathe—Swing over shears, 20"; max. distance between centers, 3'; taper turning attachment; quick change gears; double back gears; one Universal chuck; very good condition.
- 1 Hepburn Lathe—Swing over shears, 20"; 3' between chuck and carriage; one set drawn in collar near chuck; good condition.

POWER SAWS

- 5 Atkins power saws, each 14' capacity; complete with pumps; fair condition.

DRILL PRESSES (Vertical)

- 1—Barnes, 18"; fair condition.
- 1—Bertram, 42"; fair condition. Adjustable table and vertical movement on drill carriage.

PLANER

- 1—London, 36" x 36" x 7' 6", table; good condition.

TURRET BORING MILL

- 1—Bertram, 34"; turret with five bars; 17" between table and cross rail; new.

COLD SAWS

- 6—Newton cold saws; capacity 7½" for rounds; 7" for squares. Direct or line shaft drive.

CUT-OFF MACHINE

- 1—Hall, suitable for stock 4" to 6½"; fair condition.

MOTORS

- 5—10 H.P. motors, 25 cycle, 3 phase, 220 volt, 750 r.p.m.
- 5—125 H.P. motors, 25 cycle, 3 phase, 220 volt, 750 r.p.m.
- 4—250 H.P. motors, 25 cycle, 3 phase, 2,200 volt, 730 r.p.m.

GRINDER CYLINDRICAL

- 1—Ford-Smith, swing 16"; centre of wheel to center of tail-stock at max. pt. 27"; max. distance between centers, 3' 6"; actual length of bed, 6"; fair condition.

For Further Particulars Apply to

Canada Forge Plant
Canada Foundries and Forgings, Limited
WELLAND, ONT.

Below is a list of valves and fittings used in connection with pumps, accumulators and shell presses, all of which are in first-class working order:

The following suitable for 1,500 lbs. working hydraulic pressure:—

- 3—4" flanged, By-pass Valves, steel body (R.D. wood).
- 7—3" flanged, By-pass Valves, steel body (R.D. wood).
- 5—3½" flanged, By-pass Valves, steel body (Dean and Steam Pump Co.).
- 3—3" screwed ends, By-pass Valves, brass body (R.D. wood).
- 7—3½" flanged ends, Shock Relief Valves, steel body (R.D. wood).
- 5—3½" screwed ends, Check Valves, steel body (R.D. wood).
- 8—3" screwed ends, Check Valves, steel body (R.D. wood).
- 4—4" flanged ends, Check Valves, steel body (R.D. wood).
- 3—3" screwed ends, Check Valves, brass body (R.D. wood).
- 12—4" flanged ends, Balance Stop Valves, steel body (R.D. wood).
- 2—6" flanged ends, Balance Stop Valves, steel body (R.D. wood).
- 6—3½" flanged ends, Balance Stop Valves, steel body (R.D. wood).
- 20—3" screwed ends, Balance Stop Valves, brass body (R.D. wood).
- 2—3½" screwed ends, Balance Stop Valves, brass body (R.D. wood).
- 5—2" screwed ends, Balance Stop Valves, brass body (R.D. wood).

- 1—6" flanged ends, Balance Stop Valves, steel body, NEW (R.D. wood).

The following suitable for 250 lbs. working water pressure:—

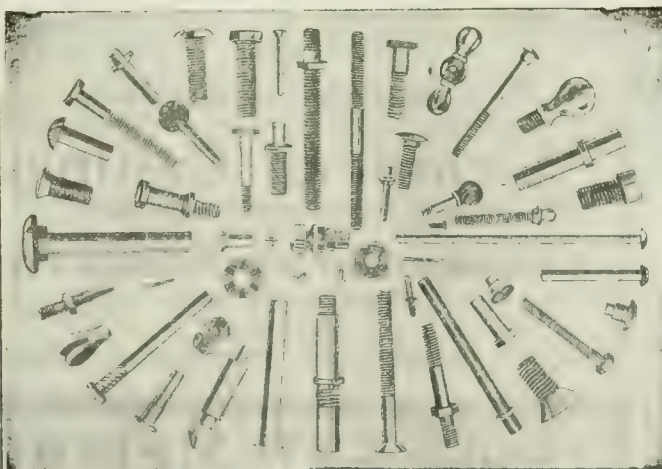
- 6—4" Pratt & Cady, screwed ends, Horizontal Flapper Check Valves, iron body.
- 2—4" Pratt & Cady, flanged ends, Horizontal Flapper Check Valves, iron body.
- 3—5" Jenkins, flanged ends, inside screw, Gate Valves, iron body.
- 3—4" Jenkins, flanged ends, inside screw, Gate Valves, iron body.
- 2—5" Crane Co., flanged ends, inside screw, Gate Valves, iron body.
- 4—4" Crane Co., flanged ends, inside screw, Gate Valves, iron body.
- 7—3½" Crane Co., flanged ends, inside screw, Gate Valves, iron body.
- 3—3½" Jenkins, flanged ends, inside screw, Gate Valves, iron body.

The following suitable for 125 lbs. working water pressure:—

- 6—5" Pratt & Cady, screwed ends, inside screw Gate Valve, iron body.
- 1—5" Pratt & Cady, flanged ends, inside screw, Gate Valve, iron body.
- 2—5" Jenkins, screwed ends, outside screw, Gate Valves, iron body.
- 5—4" Crane Co., screwed ends, outside screw, Globe Valves, iron body.
- 8—4" Kennedy, screwed ends, inside screw, Gate Valve, iron body.

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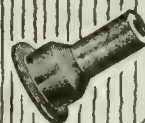
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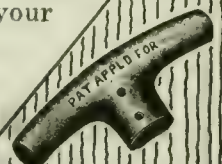


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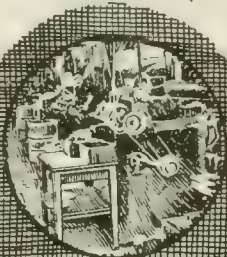
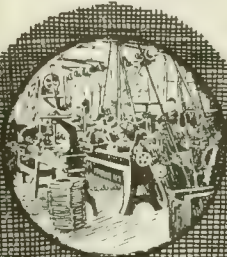
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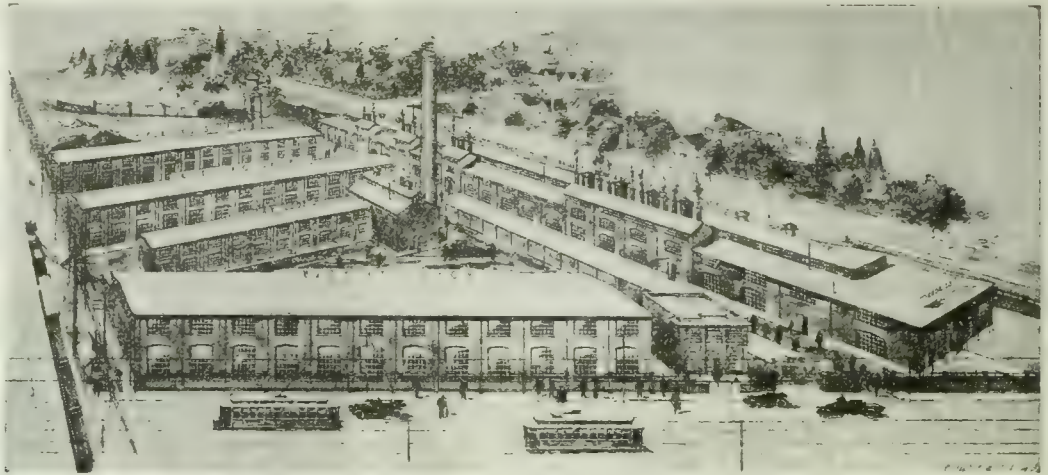
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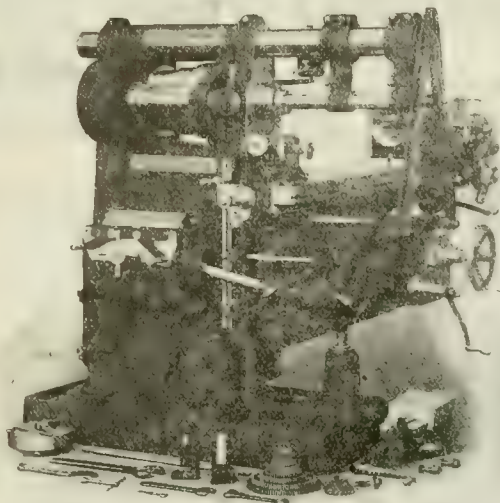
These are our SPECIAL LINES. But at this time we are prepared to handle contract work up to 15 tons per day. For gated pattern, match plate, stripping plate, machine and repetition work of any kind we are prepared to quote you most attractive prices and prompt delivery.

Would You Like to Know

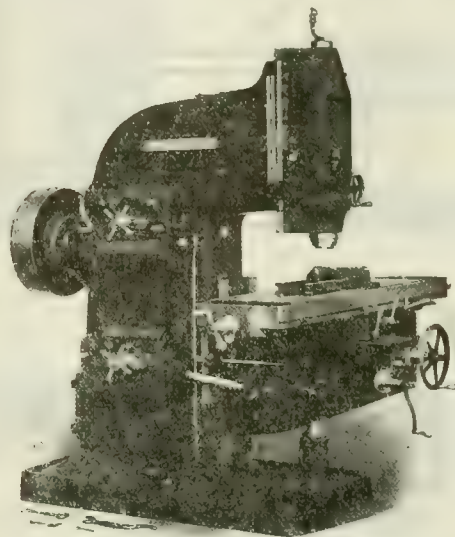
the analysis and physical test of metal in your castings? How they could be made cheaper? What properties of metal would facilitate your finishing operations or improve their quality?

We can furnish semi-finished Castings, being equipped to do lathe drilling and reaming work—also expert metal pattern work.

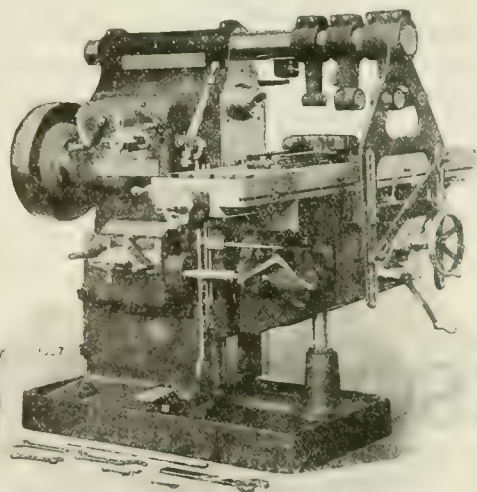
Ask Us



One of our 5-cone Driven Universal Millers. We make 8 corresponding high power single pulley machines.



One of our three sizes of high power, single pulley, vertical Millers.



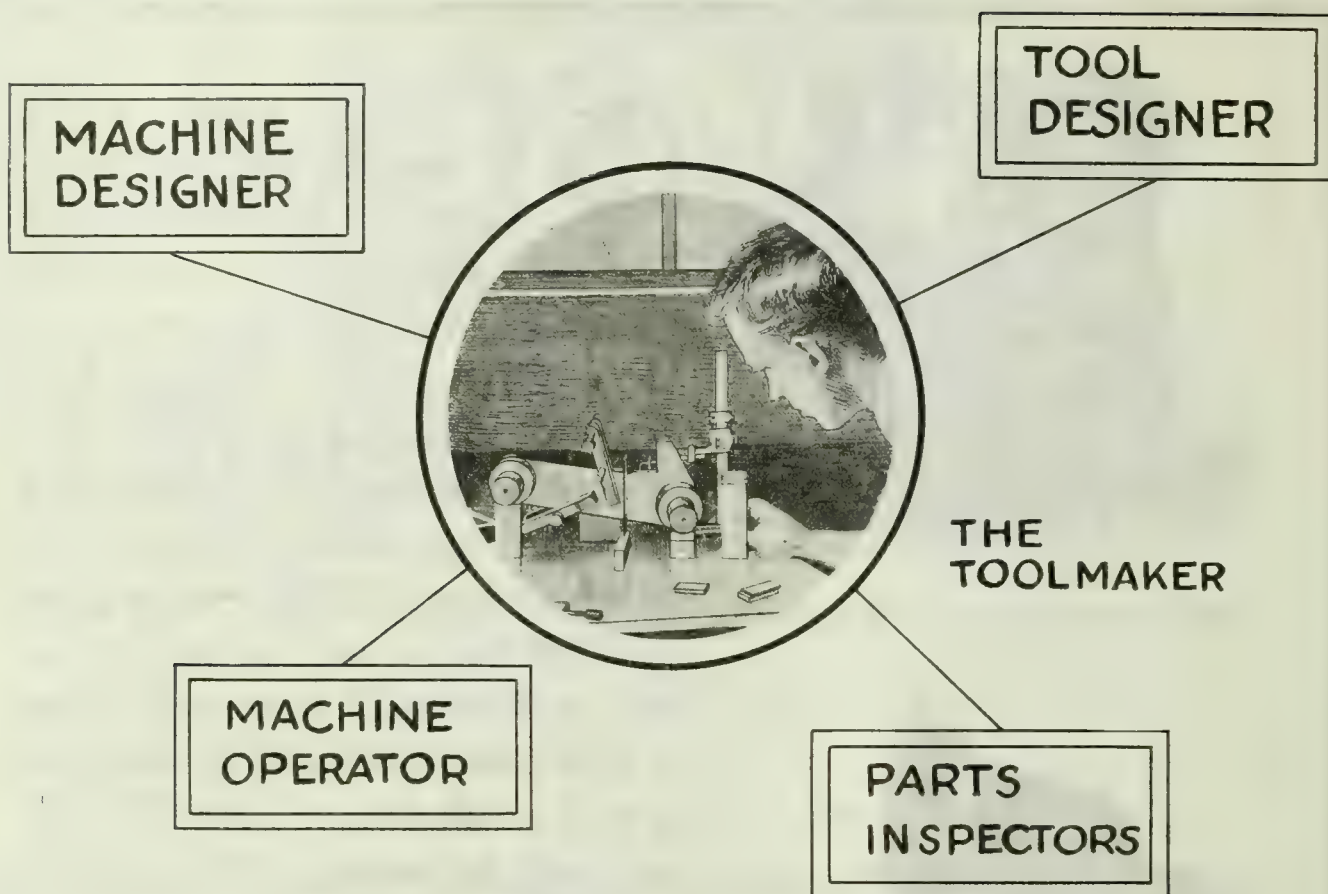
One of our 8 high power single pulley plain Millers. We also make 7 cone driven plain machines.

THE Manufacturer who is looking for any one specific size and type of Milling Machine, can exactly satisfy his need from the line of Cincinnati Milling Machines. Included is every commercial size—from 18 in. table travel to 50 in. table travel—from 1 h.p. normal capacity to 20 h.p.—from 1450 lbs. net weight to 11,000 lbs.—and between these two extremes, 27 sizes and styles of Horizontal Millers. In addition to that a full line of Vertical Millers and Automatic Manufacturing Millers.

You will grant that from such a complete line, you can fill your shop's needs in Millers as perfectly as a plug gauge fits its corresponding ring. A few of them are shown on this page. All of them have won the highest reputation everywhere. Complete details are given in our literature, which will be sent to anyone who is interested.

**The Cincinnati Milling
Machine Company**

CINCINNATI, OHIO, U.S.A.



The Center of Control

One single mistake in the toolroom causes more trouble than a hundred mistakes out in the shop. The reason for this is—the toolmaker is the centre of control of the shop's sizes. If a toolmaker does not build his work right, how can the shop production be right?

There are shops that neglect to equip their toolmakers with the means for knowing when their work is right. There are shops that expect their toolmakers to build work WITHOUT Johansson Gages so well that it will PASS INSPECTION with the Johansson Gages in the inspection department. This is putting the toolmaker at a disadvantage.

There are many toolmakers who will tell you it isn't fair to expect a man's work to pass Johansson

Gages unless he has been allowed to build it with Johansson Gages.

If you are in a busy shop of this kind, and know how Johansson Blocks would help you and the others, put the whole thing up to your foreman and get him to see the superintendent. Both of these men are very busy, but anything worth having is worth asking for. Put the Johansson Gage question before them—show them how they can get more and better work when the toolmakers are allowed to use the Blocks as a practical shop tool in building their toolwork.

It stands to reason, doesn't it, that work *built* with the Blocks will *check* with the Blocks.

Read our new gage catalog—then put the question to the men in charge.

Johansson

SWEDISH GAGE COMPANY, 10 CATHCART STREET, MONTREAL
IN UNITED STATES—245 WEST 55th STREET, NEW YORK

Standard Gages, Parallels, Angle Irons V Blocks, Etc., Carried in Stock

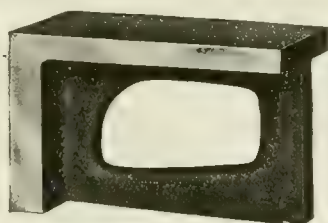
"Specials" Designed and made by our Specialists

The Taft-Peirce line of standardized tool room accessories is comprehensive—includes a wide variety of close limit equipment necessary for tool room operations—and saves time and trouble all along the line.

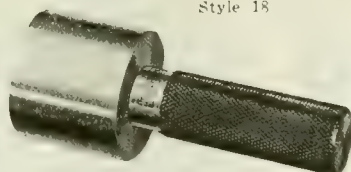


Style 16

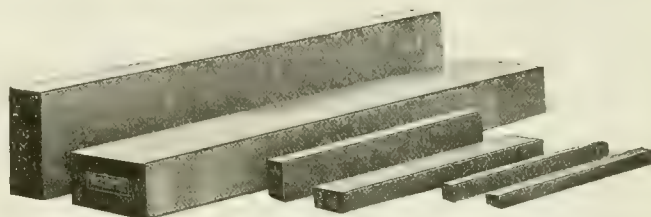
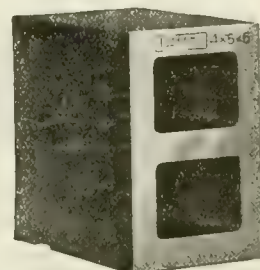
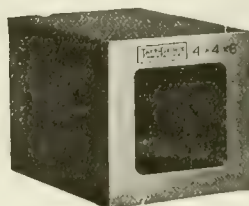
Universal Right-angle Irons



Style 18



Single-end Internal Limit Gages

Cast-iron Box Parallels
Style 160Steel Parallels
Style 150

Besides regular equipment—Standard Gages, Parallels, Angle Irons, V Blocks, etc., we have standardized certain "specials," designated by our tool specialists, notably Taft-Peirce Plug Gages—a flexible system of handles with interchangeable gages in all sizes from $\frac{1}{4}$ to 3 inches.

We carry these tools in stock and can make shipments promptly on most orders. Exact duplications on re-orders assured. Ask for Catalogue 104-E.

Adjustable External
Limit Gage
Style 2

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Woonsocket, R.I., U.S.A.

NEW YORK, Woolworth Building DETROIT, Majestic Building
WILLIAMS & WILSON, LIMITED
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PNEUMATIC TOOLS

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ELECTRIC DRILLS

AIR DRILLS

CORLISS VALVES

ROLLER BEARINGS

PRESSED VANADIUM STEEL

PISTONS AND CONNECTING RODS

Four cylinders, two on each side, with Semi-Corliss Valve close to each pair, giving greater power and efficiency.

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BROKEN FOR
SPEED, POWER
and ENDURANCE**

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99.80% pure

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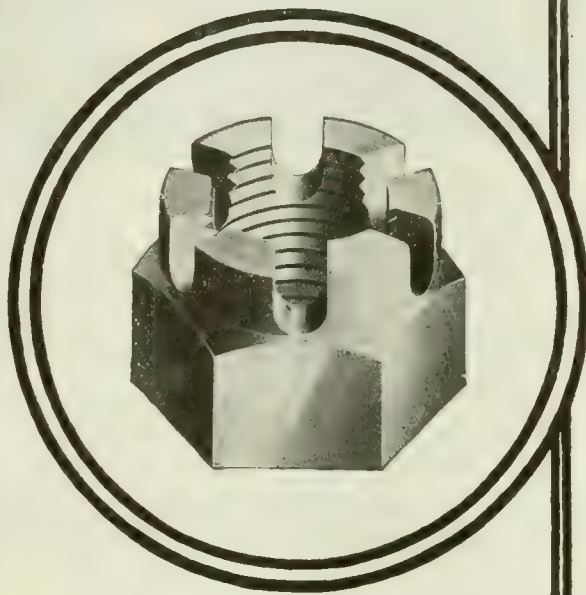
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**STANDARD
OR
SPECIAL**



NUTS

Plain—S. A. E.
Semi-finished V.—U.-SS
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**SPECIAL SCREW
MACHINE PRODUCTS**

Made to specifications in sizes up
to $2\frac{1}{4}$ " in diameter,
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The MacLean Business & Class Publications in Canada



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The Canadian Grocer (Est. 1886)
Serving the Grocery, Provision and Foodstuffs Trades
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Hardware and Metal (Est. 1889)
Serving the Hardware, Stove and Metal-working Trades.
Published weekly.

Dry Goods Review (Est. 1889)
Serving the Dry Goods Trade generally; Wholesale, Retail, Manufacturing and Department Stores. Published monthly.

Men's Wear Review (Est. 1898)
Serving the Manufacturers of Clothing, Underwear, Shirts, Collars, Neckwear, Footwear, Hats and Caps and Allied Sundries, and their Retail Distributors. Published monthly.

Canadian Machinery (Est. 1905)
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Serving the Manufacturers of Sanitary, Heating and Ventilating Machinery, Systems and Equipments, and those installing them. Published semi-monthly.

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Serving the Marine Engineering, Merchant and Ship-building Trades. Published monthly.

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Our London Office 88 Fleet Street, E. C.

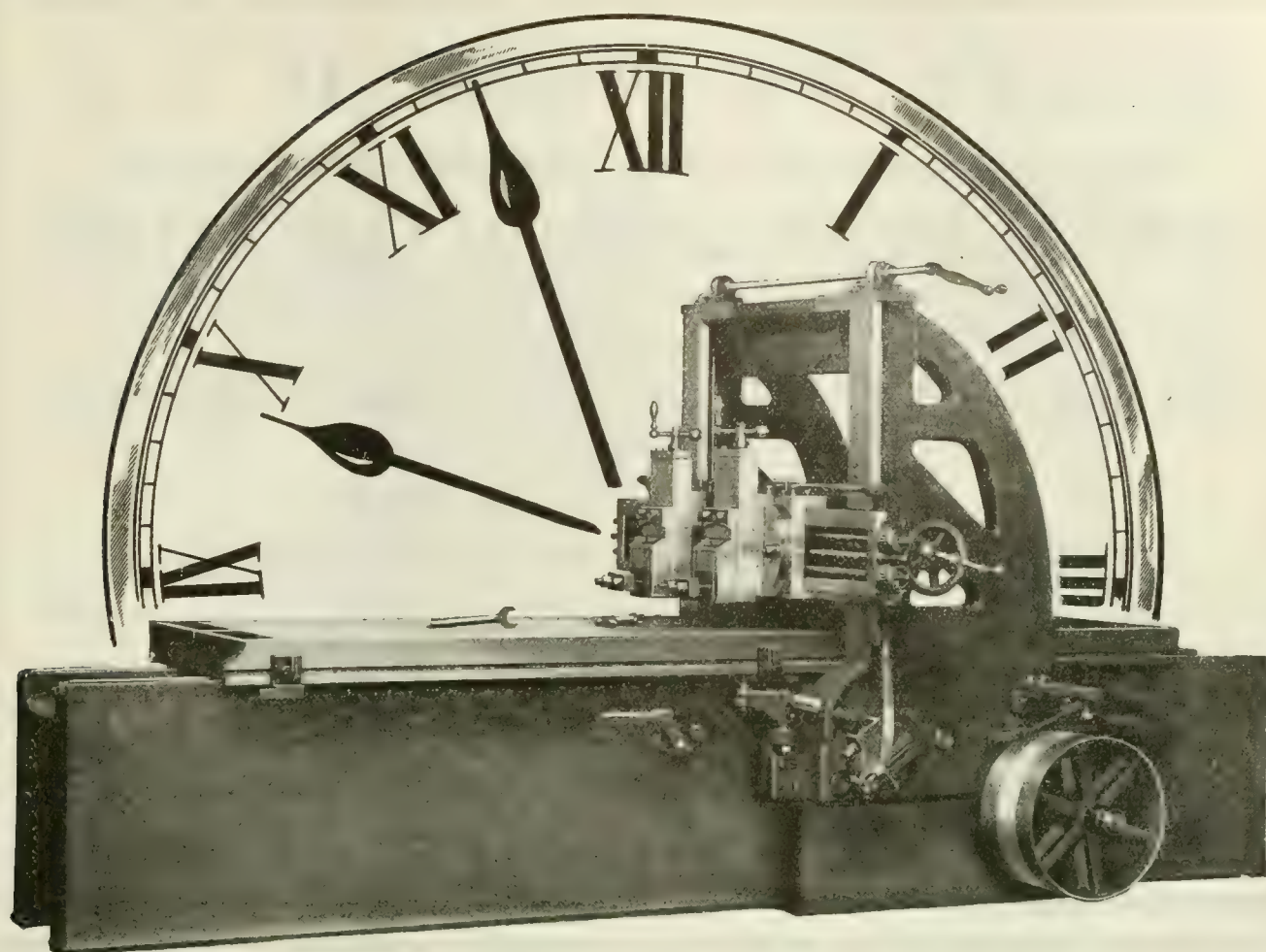
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For over 20 years the MacLean Publishing Company has maintained a fully-staffed London office, and has rendered British and Continental manufacturers, shippers, and traders an invaluable service in many directions.

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The Advantage of the Second-Belt Drive Becomes More Evident as Time Goes On

In the construction of Whitcomb-Blaisdell Planers the usual rapid running train of gears is eliminated. This means the absence of shocks and jars, and not only assists in turning out smooth, finely finished work—work that is free from chatter marks—but actually prolongs the life of the planer.

The substitution of the second belt drive for the usual train of spur gears **reduces noise and friction losses**. More power is delivered to the table, and there is a noticeable lack of "chatter." The "cushioned" reverse of the Second-Belt Drive permits the **exceedingly high table speeds** that would rack to pieces the ordinary full-g geared planer.

THE IDEA BACK OF THE WHITCOMB-BLAISDELL IS THE BEST RESULTS IN THE SHORTEST TIME.

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WHITCOMB-BLAISDELL MACHINE TOOL CO.

WORCESTER, MASS., U.S.A.

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Ready To Back It Up

YES, we're ready to back up our plain, unqualified Statement
THERE'S NO BETTER LATHE BUILT THAN THE CISCO

Try it in power or pull; test it in accuracy; compare it in simplicity of operation; use it for efficiency; run it for economy.

ITS THE BEST LATHE ON THE MARKET TO-DAY

IT'S THE
LATHE WITH THE PULL
THE LATHE OF SIMPLIFIED ACCURACY

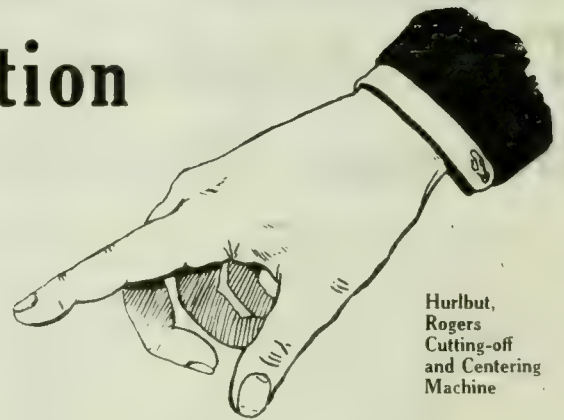
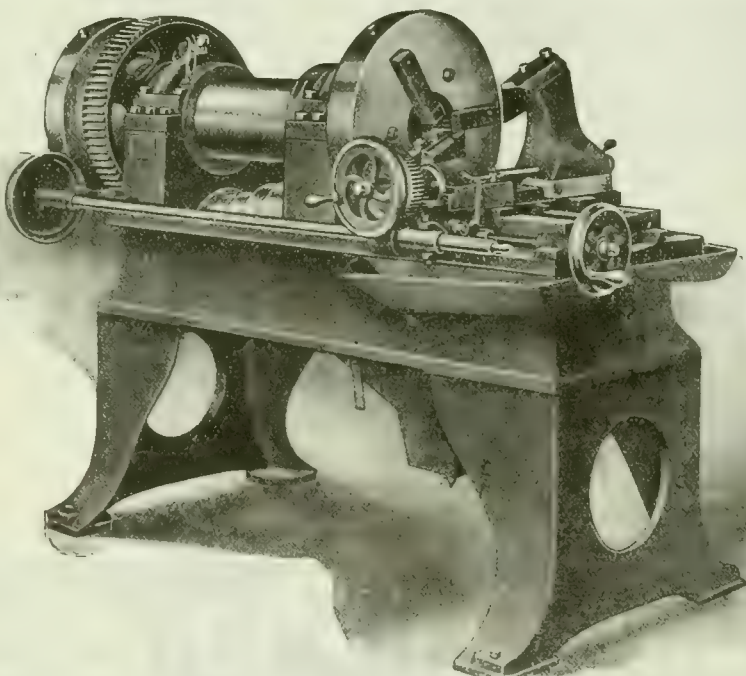
We make it in four sizes—14", 16", 18", 24". We make it either cone drive, plain motor drive, geared head or motor driven geared head.

WE MAKE IT FOR YOU

The Cisco Machine Tool Company

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Doubles the Production —Cuts the Cost in Half



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TWO Tools work in the same cut on the HURLBUT, ROGERS PATENT CUTTING-OFF AND CENTERING MACHINE. Twice the amount of work is turned out.

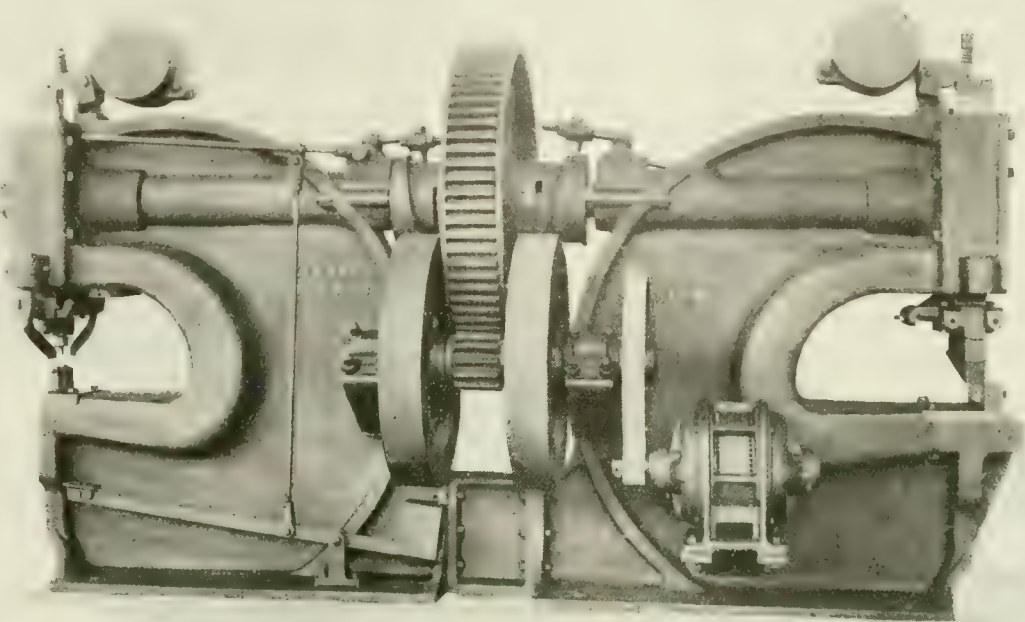
Don't you think this opportunity of doubling your production, and cutting your costs in half is worth investigating? Look this illustration over carefully, then drop us a line for the full details—do it now!

The Hurlbut, Rogers Machinery Co.
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Built for Real Service

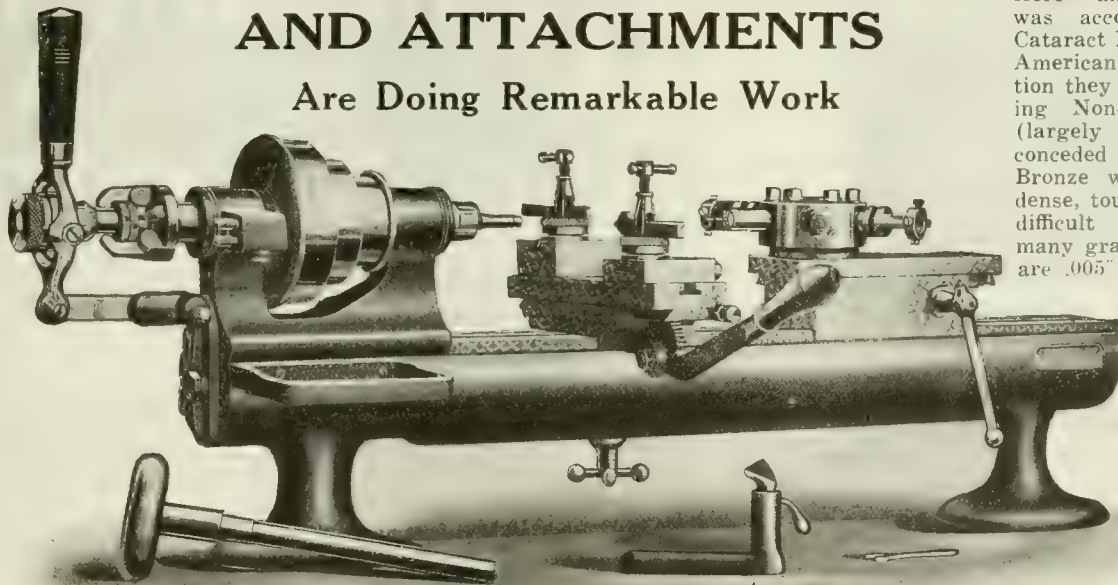


We also manufacture High Grade Horizontal and Vertical Rolls, Angle Rolls, Single Punches, Shears, Sprue Cutters, Radial Wall Drills or Counter-sinking Machines, Flanging Clamps and Heavy Duty Engine Lathes. Ask for Catalogue.

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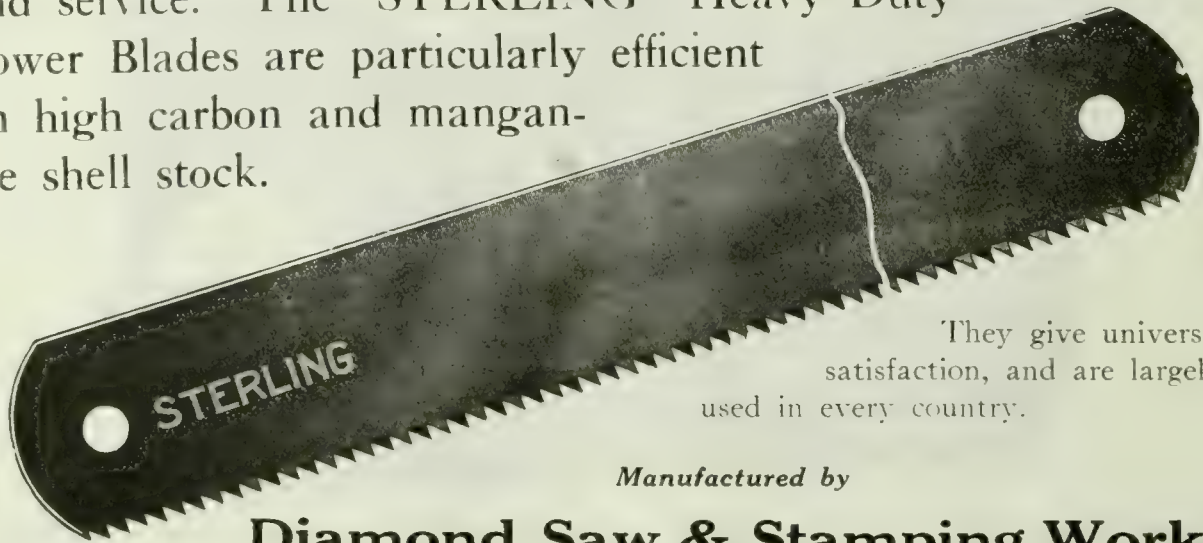
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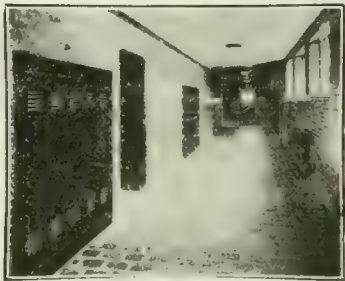


They give universal satisfaction, and are largely used in every country.

Manufactured by

Diamond Saw & Stamping Works
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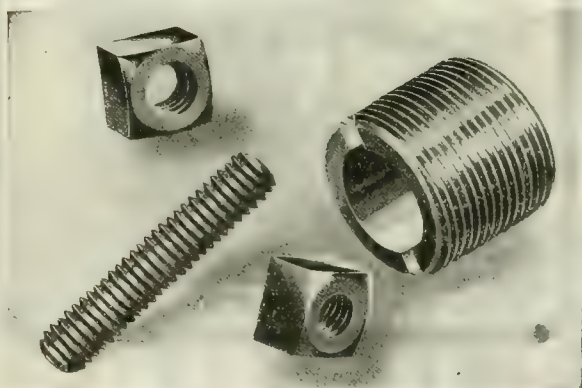
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Manufacture Brass Automatic Screw Machine products. Capacity of machines $\frac{1}{8}$ in. to 2 in.

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Hand Milling Machines

for hand feed or with
power attachment.

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MACHINE TOOL COMPANY**

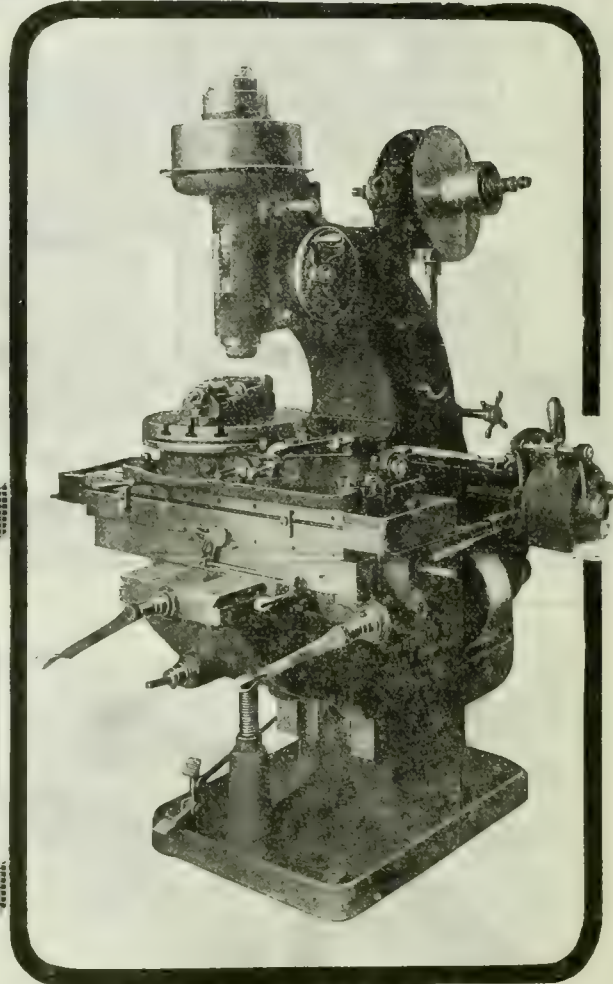
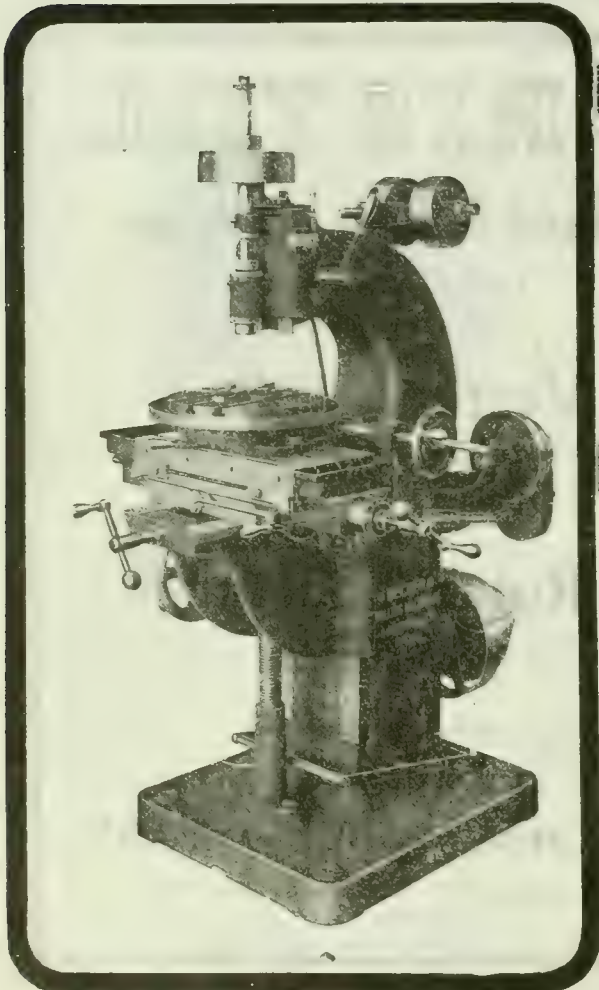
Successors to C. G. Garrigus Mach. Co.
Bristol, Conn.

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Belt Driven Millers

*The Machine that Gives the
Smooth Finish*

Days of stiff competition are dawning. It behooves you to adopt time-saving equipment of the most modern type to secure work and produce it at a profit. Becker Millers are the tools you need. Their great productive qualities justify any manufacturer in replacing present equipment with these modern machine tools.



Consult our Engineers Regarding Milling Problems

Our engineering department is prepared to advise you. Send blue prints and they will give you estimates on your work.

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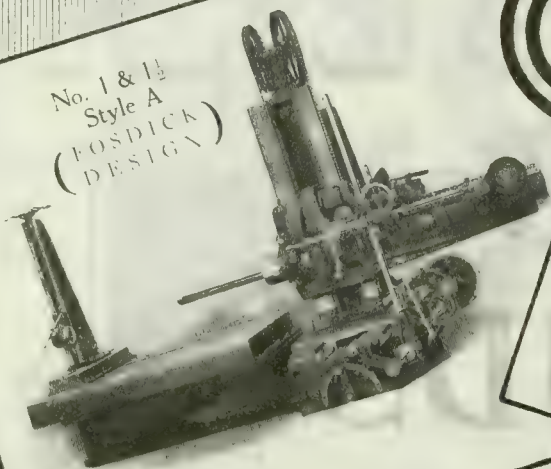
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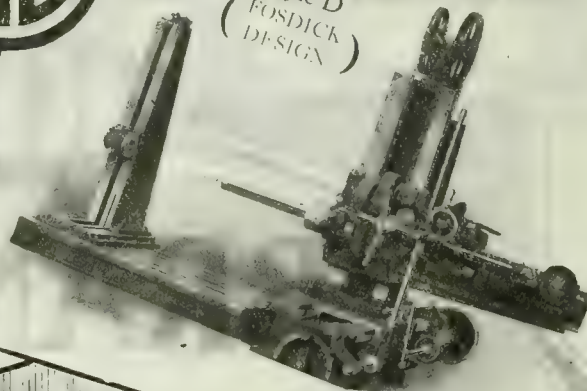
Montreal, Que



No. 1 & 1½
Style A
(FOSDICK)
DESIGN



No. 1 & 1½
Style D
(FOSDICK)
DESIGN



Size of Machine	No. 1	No. 1½	Size of Machine	No. 1	No. 1½
Diameter of spindle	2½"	4"	Speeds	4 to 255 R.P.M.	20
Morse taper No.	5	6	Vertical progression	12	12
Traverse of spindle	8"	20"	Feeds, in all directions	100" in	
Vertical adjustment of head	36"	54"	to ¼ in per revolution	8	8
Horizontal adjustment of column	26"	62"	Motor horse power	7½	10
Maximum work bed to centre of spindle (Style D)	44"	62"	Table space	9' x 15'	11' x 2'
Size of work bed	12' x 72"	12' x 120"	Total height of machine	8' 9"	14' 3"
			Net weight (Style A machine)	16,000 lbs	21,000 lbs
			Net weight (Style D machine)	15,000 lbs	19,500 lbs

HORIZONTAL Boring, Drilling and Milling Machine

Built for accurate machinery of pieces whose shape and size make it impossible to handle them any other type of machine tool.

Designed with a view to adaptability, simplicity and ruggedness, accomplishing convenience and ease of operation and elimination of all vibration.

NO. "4" FOR BIG WORK

Diameter of spindle	No. 6 Morse
Size of hole in spindle	8" x 12"
Size of floor plate	18' x 24' 6"
Weight	20,000 lbs.

NO. "0" FOR PRECISION WORK

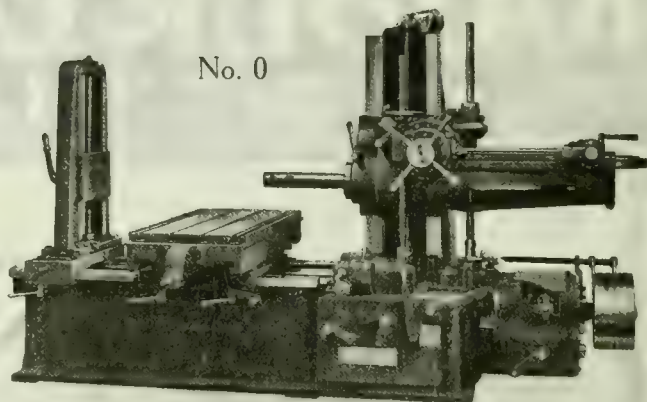
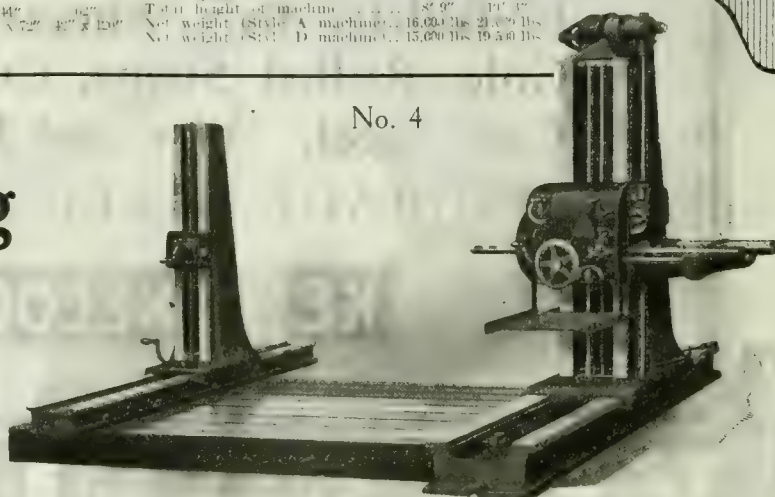
Diameter of spindle bar	5½ in.
Spindle bored to fit Morse Taper No.	5
Longitudinal travel of spindle	24 in.
Vertical adjustment of head on column	25½ in.
Size of table	4 in x 30 in.
Traverse travel of table	30 in.
Longitudinal travel of table	32 in.
Approximate net weight	9,500 lbs.

Drop us a line for detailed information and catalogue.

Giddings & Lewis Manufacturing Company, Fond Du Lac, Wis.

Foreign Agents: Canadian Fairbanks-Morse Co., Toronto, Montreal, Winnipeg, Vancouver; Fenwick, Freres & Co., Paris, Lyons, Liege, Zurich; Burton-Griffiths & Co., England; Wynmalen & Hausmann,

Rotterdam; R. L. Scrutton & Co., Ltd., Sydney, Australia; Rylander & Asplund, Stockholm; Wilh. Sonesson & Co., Malmö



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High Speed STEEL HOISTS

The Right Solution for
Your Lifting Problem

Wright Hoists will outlift and outlast any other block on the market.

Every load sustaining part is practically indestructible.

Constructed of steel and cast iron throughout.

Wright hoists raise loads quickly, easily and economically—they are the Hoists that NEVER FOUL, the hoists that will save money for your plant.

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WRIGHT MFG. CO., LISBON, OHIO

Canadian Agents:

THE A. R. WILLIAMS MACHINERY CO., LIMITED

Montreal Winnipeg Vancouver Detroit St. John, N.B. Toronto Buffalo



Chapman

Double Ball Bearings

CONSERVE POWER! There is too much power going to waste the world over. This fact has been noted by the British Government and sweeping reforms are contemplated in Great Britain.

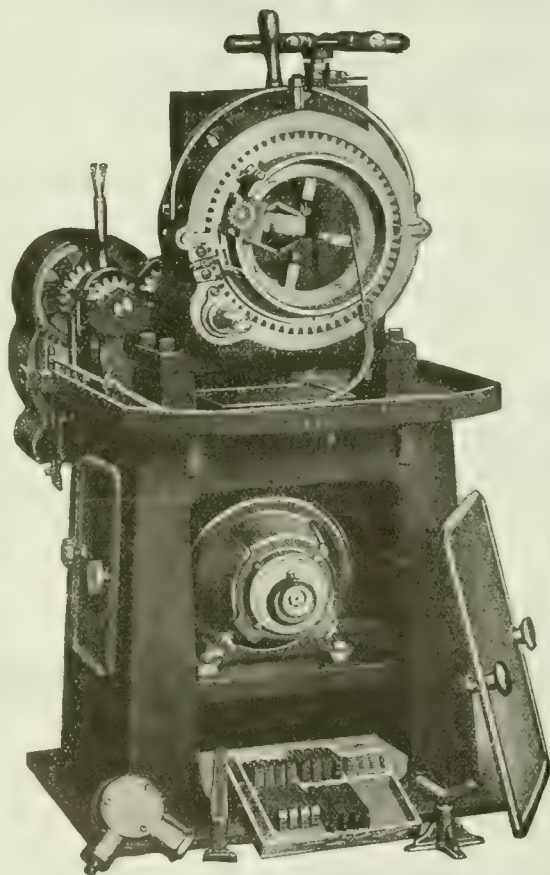
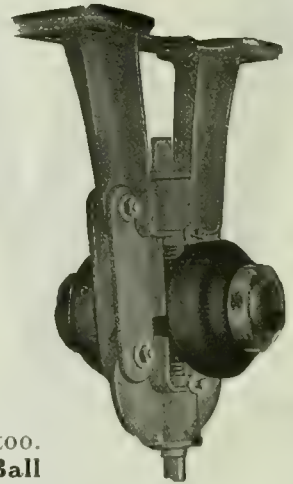
Canada also wastes much power. A reform is necessary here, too. Babbitt bearings are being used too often where **Chapman Double Ball Bearings** should prevail. The adoption of Chapman Double Ball Bearings, wherever an axle or shafting needs support in the transmission of power, results in a saving of 75% of friction loss.

Now in use in over 2,000 Canadian factories. Fit any adjustable hanger. Adopted by Canadian and United States Governments.

Write for full story of their efficiency.

Chapman Double Ball Bearing Company of Canada, Ltd.

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Transmission Ball Bearing Co., Inc., 1050 Military Road, Buffalo, N.Y.



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The Forbes can be carried to the job, saving time and expense of hauling pipe to and from your shop. The larger size "Forbes" will cut 15" pipe.

Get a copy of our catalog now and learn how a Forbes saves labor, time, increases production and profits.

The Curtis & Curtis Company

115 Garden Street, Bridgeport, Conn.

IMPERIAL CARBIDE



For
Welding
Cutting
and
Lighting



Manufactured by
Union Carbide Co. of Canada, Ltd.

Head Office:
Dominion Bank Bldg.
TORONTO, ONT.

Works:
WELLAND
ONT.

Large Stocks maintained at convenient distributing
centres throughout Canada

RHODES SHAPING AND SLOTTING MACHINES

Put Your Shop on a Better Paying Basis

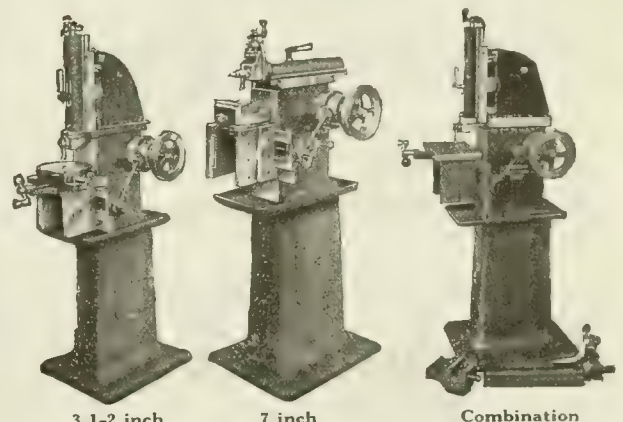
Why tie up expensive equipment on your shaping and slotting operations when the RHODES Improved Shaping and Slotting Machines will do the work quicker, cheaper and more efficiently?

The Rhodes cuts the costs of tool-making, die-making, modeling and other classes of light work of this nature. Their capacity is greatly promoted by adjustments which are quickly and easily attached.

Rhodes shapers and slotters have won their way into the best shops of the world. Let us prove to you their ability to make good in your plant.

The Rhodes Mfg. Co.

Owned and Operated by the Jacobs Mfg. Co.
Hartford, Conn., U.S.A.



3 1-2 inch

7 inch

Combination



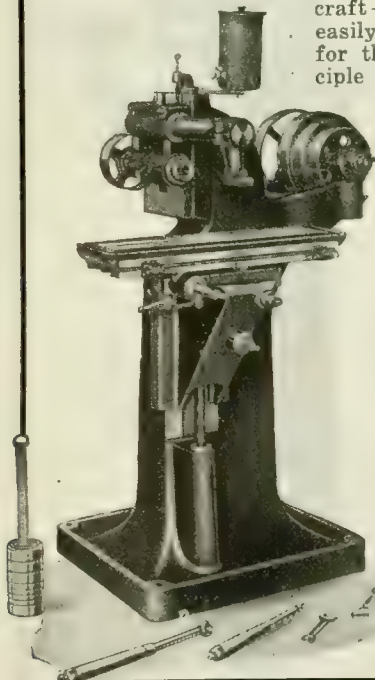
Battleships steamed for the harbor when enemy submarines were about. That's where they belonged. The work of fighting the deep sea pests was left to smaller craft—they were quicker, more easily handled and more capable for the work. The same principle should apply in your shop practice.

U.S. MILLER

should be used for milling small parts. They too are quicker, more easily handled and more capable for this work than big tools. You can actually reduce your milling costs one-third to one-half on each part by the use of the U. S. Hand and Weight Miller. Finely built to combine speed, accuracy and durability.

**United States
Machine Tool Co.**

CINCINNATI
Ohio U.S.A.





A Time Saver— Can You Beat It?

HAVE you noticed the Consolidated Clamp Connection on all Consolidated Presses? Grips like a vise and stays put, one of the bull-dog kind, which, when properly tightened, will not break away, or slip.

If you break it we will furnish a new one free of charge.

Consolidated Press Company

HASTINGS

LARGEST EXCLUSIVE MANUFACTURERS OF POWER PRESSES IN U.S.A.

MICHIGAN

Canadian Representatives: A. R. WILLIAMS MACHINERY CO., Limited, Toronto, St. John, Winnipeg, Vancouver

RICKERT-SHAFER TAPPERS

The *smooth drive* reduces the strain on the taps—they wear longer—and there are fewer delays from taps breaking in the work.

R-S Tappers ensure faster tapping and quicker assembling.

Friction drive, absorbing all the shock, allows a chuck speed of 140 r.p.m. on $\frac{5}{8}$ -in. work—50 per cent. faster than the usual tapping speed for that size. Uses but 1 h.p.

Write for specifications

The Rickert-Shafer Co.

ERIE, PA., U.S.A.

FRED HERBERT, Foreign Agent, Coventry, England

Save Tap Breakage



$\frac{1}{4}$ -in.
Vertical
Tapper

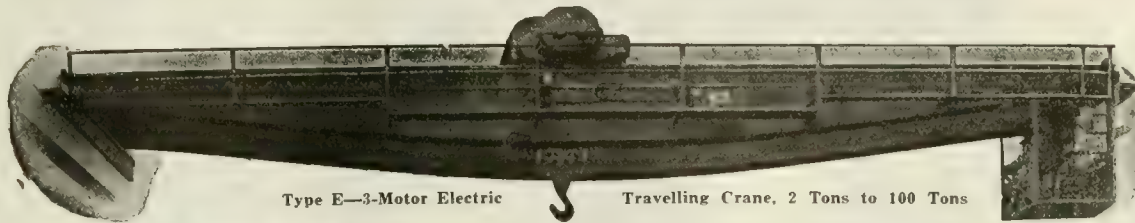


Column Type
Horizontal
Tapper

CANADIAN MADE

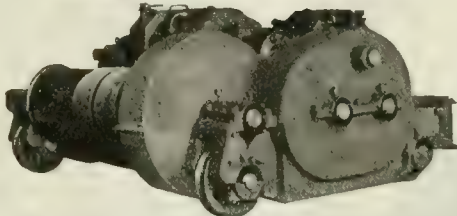
CANADIAN MADE

Electric and Hand Traveling Cranes



Type E—3-Motor Electric

Travelling Crane, 2 Tons to 100 Tons



Northern Type E Crane Trolley, Rigid, Enclosed Construction. Patented in Canada.

We make a wide range of CRANE and HOIST designs. All sizes and capacities, 1 ton to 100 tons.



Single Girder Electric Hoist Crane, Type D-158, 1 Ton to 10 Tons. Made also double girder design.

Made also for Hand Hoist or Air Hoist.

Get our prices and specifications before you buy.

In asking prices, state SERVICE, CAPACITY, SIZE OR SPAN POWER, and, if electric, KIND OF CURRENT.

Catalogs free.



Type D Electric Hoists — ½ to 10 Tons.

Air Hoists, Trolleys and Tracks.

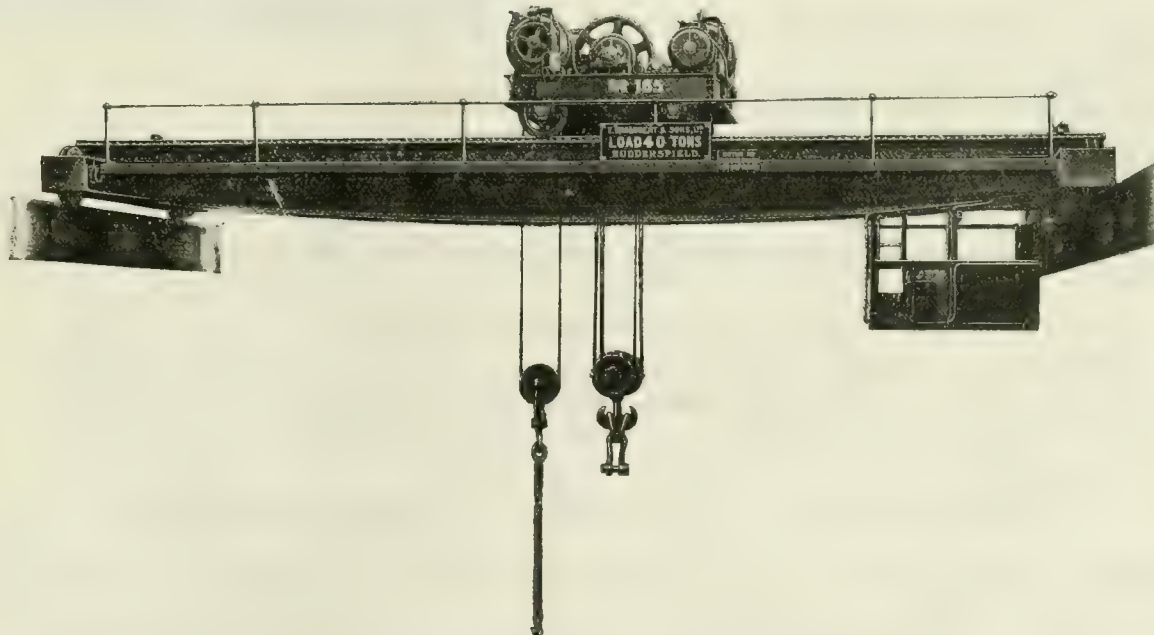


Type No. 20 Air Hoist.

Northern Crane Works, Limited

Walkerville, Ontario, Canada

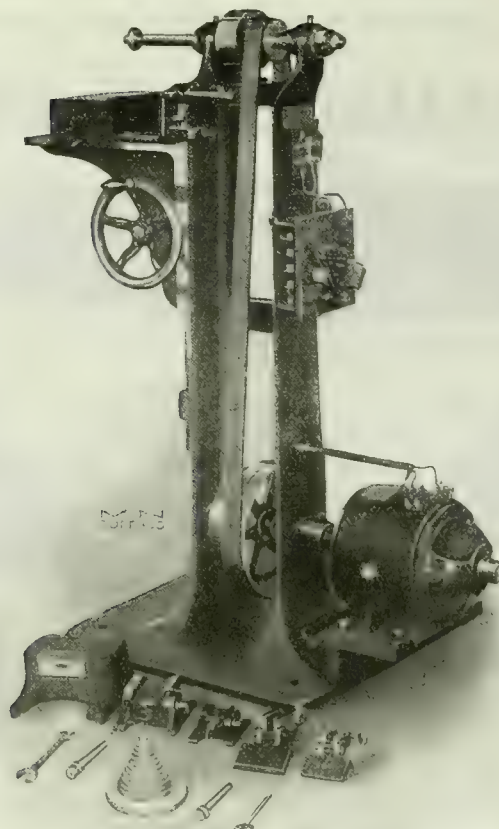
ELECTRIC CRANES & CAPSTANS



CATALOGS
POST FREE

THOMAS BROADBENT & SONS LIMITED
HUDDERSFIELD
ENGLAND

CODES
A. B. C. LIEBER A. 1.



The "MODERN" Die Chaser Grinder

Let Your Die Troubles End Right Here

Why let Die Trouble stand between you and maximum production?
In the

Modern Die Chaser Grinder

you will have a machine that does away with die trouble—because its output is **marvellously eccentric.**

Made for belt drive or a complete motor-driven unit. Special attachments for grinding Spring Dies, Pipe Dies, Reamers, Taps, Hobs, Spiral and End Mills, Milling Cutters, etc.; can be furnished with the regular equipment.

For Fast Accurate Work

Bulletin C. G. will give you full details. We would also be pleased to send you full particulars re "**Modern**" **Self-Contained Grinding Machines.** Tools splendidly adapted to meet the present demand for large production.

Modern Tool Company

Main Office and Works: State and Peach Streets, Erie, Pa., U.S.A.

Canadian Agents: Rudel Machinery Co., Toronto and Montreal

New York Office: - 50 Church Street

Chicago Office: - 32 N. Clinton Street

F. Wesley Parker, Resident Engineer and Export Agent, 2 Rector Street



"That's why the Plating Room is always ahead of the work"

This Advertisement is one of a series based on actual occurrences in the industry.

"The Oakite Platers' Cleaner in that tank does it.

"The day the Oakite man got in here, we were cleaning steel automobile bumpers which were covered with emery and oil. We were about 300 behind and were only turning out about five or six an hour, because we had to brush them.

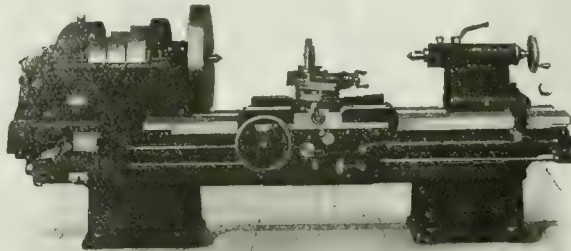
"The Oakite man made up three tanks with Oakite Platers' Cleaner and we caught up on our back work in *one day*—eliminated brushing—and we have never been a single piece behind since."

OAKITE MANUFACTURED BY
OAKLEY CHEMICAL CO.
44 THAMES STREET · NEW YORK

*Sidney
for
Service*

*Heavy
Duty
Engine
Lathes*

Sidney-for-Service Lathes are noted for their power and rigidity. Take deep cuts through toughest metal without pause or chatter.



Specifications include 3-step cone, double back gear, semi-quick change gear lathe, built on 10 ft. bed. This lathe also furnished with quick-change gears. Bed lengths available: 10, 12, 14, 16, 18 and 20 feet.

The Sidney Line comprises 15-inch, 17-inch, 19-inch, 25-inch, 27-inch, 30-inch and 36-inch lathes, which are adaptable to the finest tool room work or the heaviest duty shipyard or factory rapid production work.

The Sidney Tool Company, Sidney, Ohio

Canadian Agents: The Geo. F. Foss Machinery & Supply Co., Montreal, Quebec. H. W. Petrie, Limited, Toronto, Ontario.

LANDIS

PRODUCTIVE MINUTES

Every minute is a productive one on a Landis Grinding Machine. All control levers are within easy reach of the operator.

The Automatic Sizing Device assures accurate duplicate work and permits the operator to prepare work while the machine is in operation.

Independent work and traverse speed change levers, readily shifted during operation of machine.

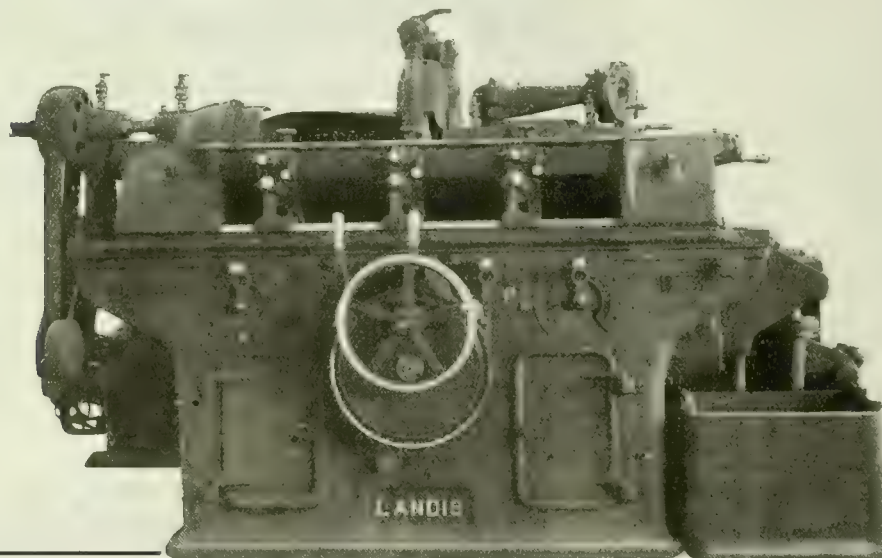
The Landis is a superior manufacturing grinding machine for straight and taper work.

Catalog contains full details. Write.

LANDIS TOOL CO.,

50 Church Street, New York City

WAYNESBORO, PENN.

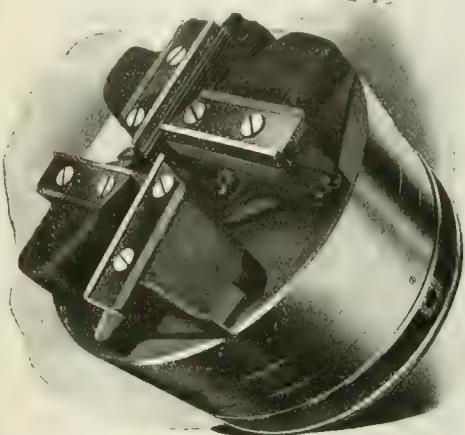


LANDIS—The Reconstruction Threading Tool

Threads will play a mighty big part in reconstruction here and abroad. Economy in producing these threads will be more important now than ever, and it is vitally necessary that the most efficient and most economical machines be employed.

Landis Die Heads and Machines will meet all demands, whether for quality, production or low threading cost. The chaser is fundamentally different in design from any other thread-cutting tool, and this design insures clean-cut, well-formed threads on iron, steel, brass, monel metal or any material.

Production is doubled due to the chaser having a strictly tangential disposition to the cutting edge, thereby eliminating all unnecessary friction.



Threading costs are reduced from 50 to 75% since the chaser is merely given a slight grinding at the cutting edge, when dull. The chaser has three inches of available cutting material, which permits of 90 to 120 grindings, and no annealing, hobbing or retempering is necessary.

Familiarize yourself with the other big features; they are worth knowing.

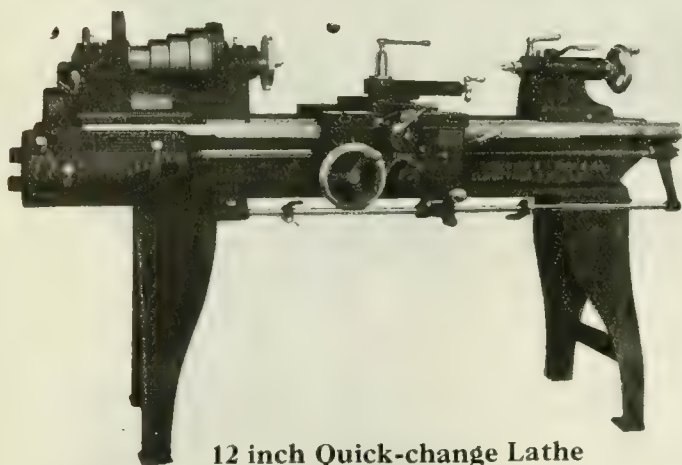
Ask for Catalogue No. 24

LANDIS MACHINE COMPANY

Waynesboro, Pa.

"STAR" LATHES

9"-11"-12"-13" Swing Sizes



12 inch Quick-change Lathe

Simply and strongly built,
only the very best material
and workmanship goes
into them.

The Seneca Falls Mfg.
Co., Inc.

366 W. Falls St. SENECA FALLS, N.Y.

Canadian Agents:

The A. R. Williams Machinery Co.

ST. JOHN, N.B. MONTREAL OTTAWA TORONTO WINNIPEG VANCOUVER

TRADE

FOX

MARK

REGISTERED

MILLING MACHINES

FOR

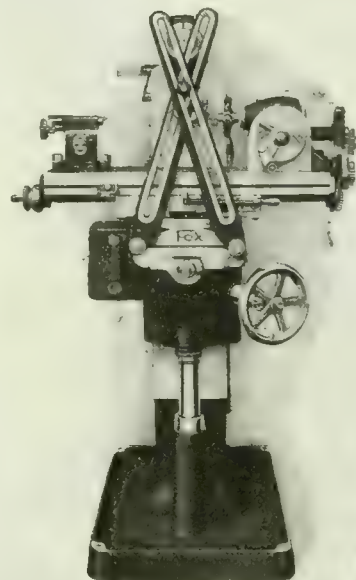
Rapid Production of Motor Parts

The demand for increased production **requires tools of great strength and durability**; the Fox 2-A Universal Milling Machine illustrated has met this demand, and is being used wherever extreme accuracy and quantity production are required.

The machine has a universal table, spiral cutting attachment, 10" Dividing Head with 6" Universal Chuck, making it a machine **especially adapted for Tool Room Work**.

The **United States Government** used this machine in its various **repair shops for Aero-plane Motors**.

You should be using this tool to help the production of parts necessary for reconstruction.



Specifications—No. 2-A Miller.

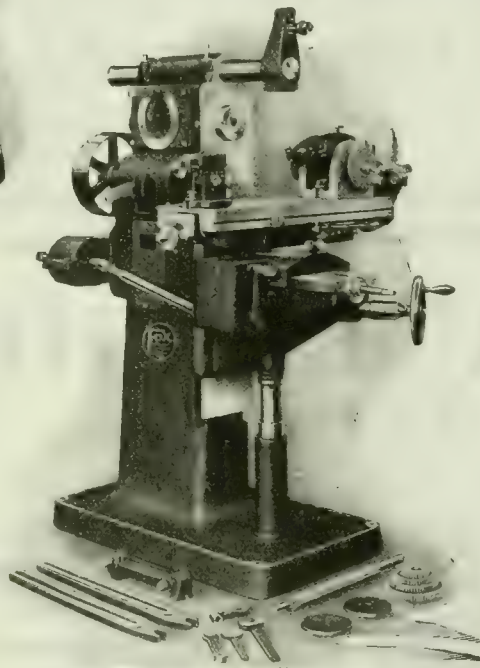
Spindle speeds 12
From 21 to 423 r.p.m.

Table feeds 6
From .317" to 2.79"
per min.

Table 8½ x 27"
Long. feed (power)
26".
Vertical feed (hand)
13".
Trans. feed (hand)
8½".

Drive...Single pulley
10 x 3" running 250
r.p.m.

Gears -- Hardened
steel.
Weight : 1,500 lbs.



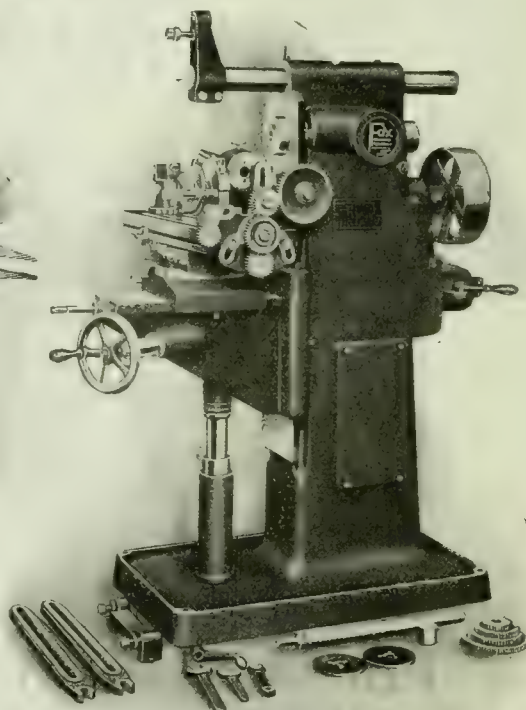
We build this same machine with a plain table, omitting the spiral cutting attachment and Dividing Head.

Our No. 1 type machine has a four-step cone drive, and while being a lighter machine is a "bear" for work. This was proven by the **hundreds of them in the largest munitions plants**.

We also build the Fox Multiple Spindle Drilling Machines.

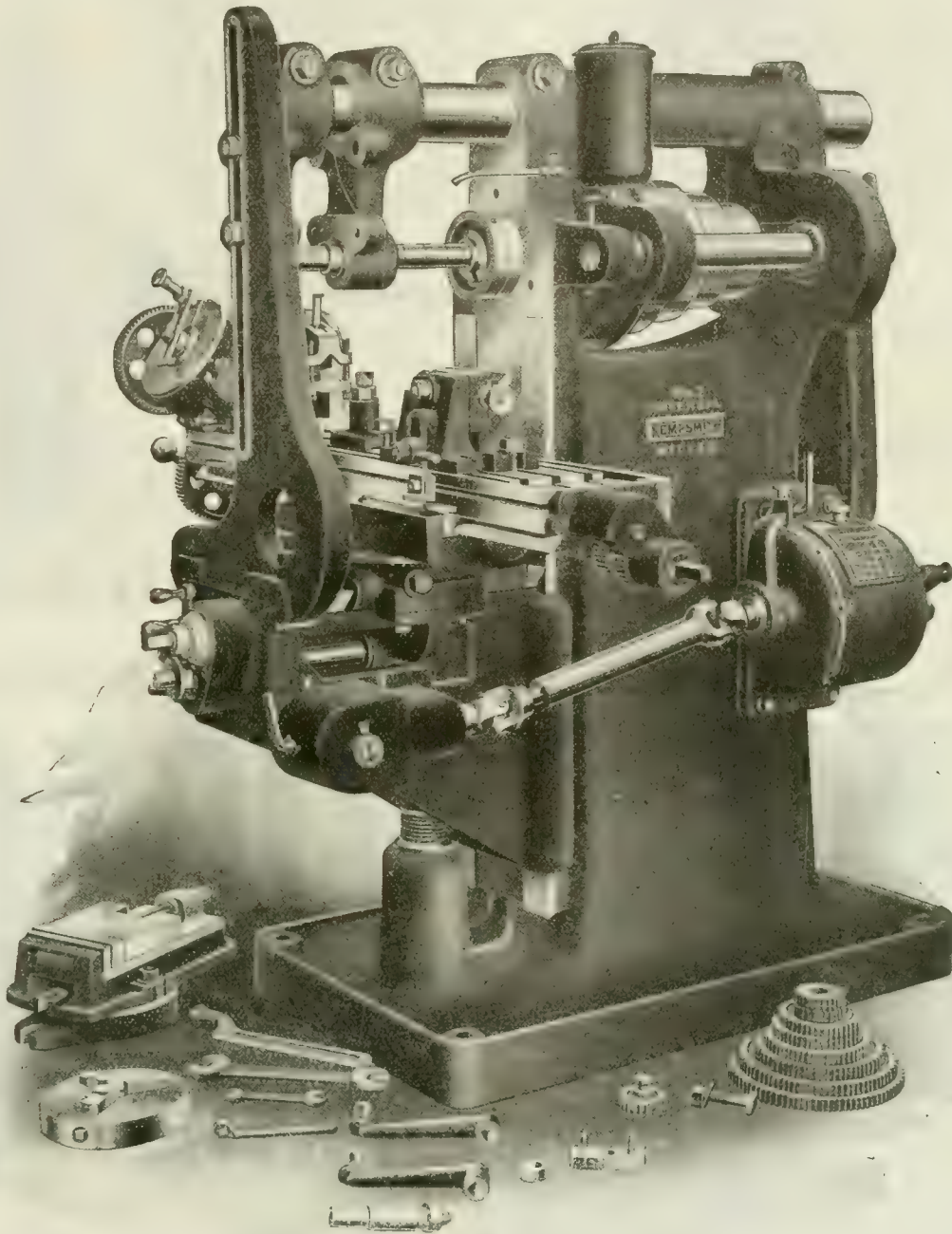
FOX MACHINE COMPANY

1047 W. Ganson St., Jackson, Michigan, U.S.A.



KEMPSMITH

MILLING MACHINES



KEMPSMITH No. 2 Universal Milling Machine

Equipment—Double friction countershaft, 10½ inch Universal Dividing Head complete with tailstock, centering rest, Hill patent dog and driver, two index dials, set of change gears for spiral milling and index charts for operating; 6 inch Universal Chuck, 1 inch arbor, two arbor supports, brace, No. 3 Swivel Vise, outside tool shelf and all necessary crank handles, wrenches and accessories as shown.

THE KEMPSMITH MANUFACTURING COMPANY

MILWAUKEE, WIS.; U. S. A.

FOREIGN AGENTS: Barandiaran & Co., 3 Alameda, San Sebastian, Spain. Edgar Bloxham, 12 Rue du Delta, Paris, France. D. Drury & Co., 1-2 Central House, Main St., Johannesburg, S. Africa. Nielsen & Winther, Copenhagen, Denmark. Parke & Lacy Co., Ltd., 60 Clarence St., Sydney, N.S.W., Australia. Selson Engineering Co., 85 Queen Victoria St., London, E.C., England, and 19 Via Botero, Turin, Italy. Spliethoff Beeuwkes & Co., Leuvehaven, W.Z. 159, Rotterdam, Holland. American Trading Co., Tokio, Japan.

A Fitter Fit Is Impossible

The "B-T" Reverse Tapping Attachment fits any make of drill press. It eliminates the necessity of reversing the machine spindle. Simply raising the spindle reverses the tap—the machine, meanwhile, goes ahead at full forward speed.

A reverse speed twice that of the tapping speed is given by an internal gear drive. It is friction driven—automatically adjusted by the amount of pressure the operator puts on the drill spindle. It saves taps, trouble, time and money.

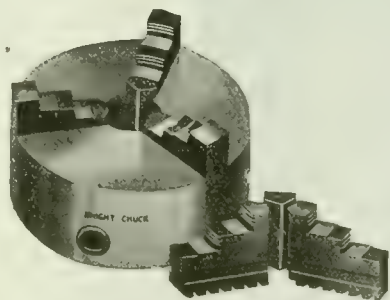
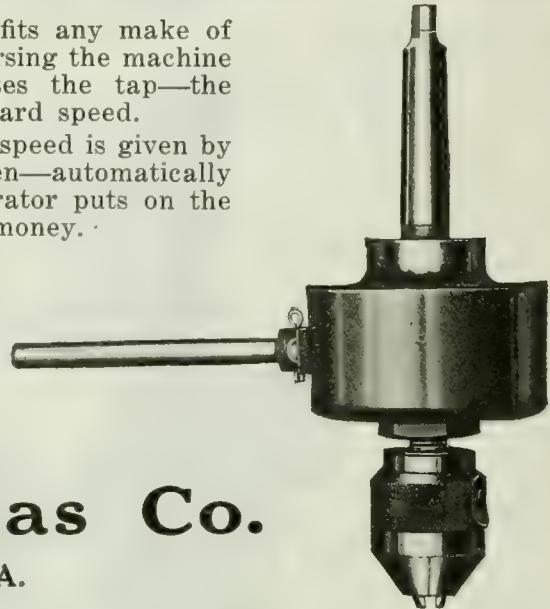
Can also be had with positive drive. Both plain and friction chucks are fitted with jaws to grip round and square end of tap.

Get the details—In our Bulletin
Write to-day.

Bicknell Thomas Co.

Greenfield Mass., U.S.A.

"B-T" Reverse Tapping Attachment



Scroll Chucks

Three-Jaw Universal Geared

The best material obtainable is used in the manufacture of KNIGHT Chucks.

First grade gray iron bodies and backs, steel scrolls, pinions, jaws and wrenches.

These chucks are thoroughly tested and inspected as to workmanship, position, synchronization and finish before leaving the factory.

Knight Metal Products LIMITED

119 West Adelaide Street
Toronto, Ont., Canada

Cable: "Knightmetl"; Code, Western Union



Do threading operations in actually less than half the time ordinary taps require, because Victor Collapsible Taps trip positively and operate extremely fast. They make smooth, clean threads because, when backing off, they never clog with chips and roughen or tear the thread. Sizes 1 1/4" to 12".

Send blue-prints for time estimate on shell work and other threading.

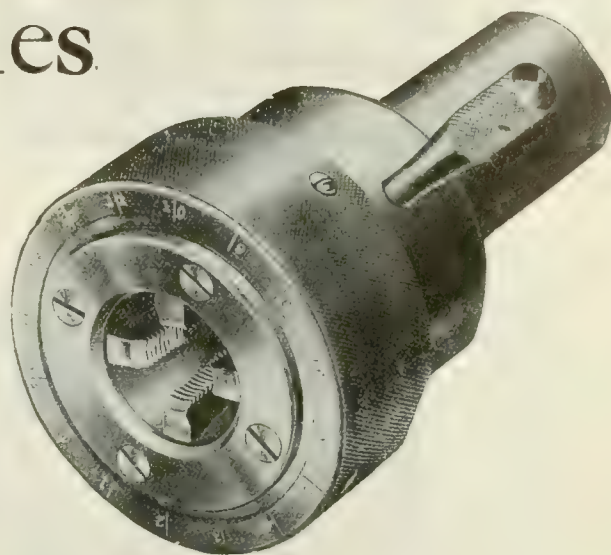
Victor Tool Company Waynesboro, Pa., U.S.A.

Quick Deliveries

ON

MURCHEY CHASERS

We make a specialty of quick deliveries to the users of our tools, and if you'll become one of our patrons you'll find at the end of a year's time that you have saved many hours' valuable time through the quick deliveries we make on Murchey Chasers.



This saving, coupled with the great economy that always accompanies the use of Murchey Automatic Self-opening Dies, Collapsing Taps and Hand Sizing Taps, is a saving worth while in these days of high production costs. Use them.

ENQUIRIES GLADLY ANSWERED

MURCHEY MACHINE & TOOL CO.

75 PORTER STREET, DETROIT, MICH.

The Coats Machine Tool Co., Ltd., Caxton House, Westminster, London, S.W., England
Fenwick Freres & Co. - - 16 Rue Fenelon - - Paris, France

H & G

Die Head Cuts Perfect Threads

The H. & G. Die Head illustrated is only 3 3/8" outside diameter, yet it will cut from the smallest up to 1" standard thread and up to 1 1/2" fine threads. For absolute proof of its ability to stand up and give good results, see the perfect threads it cuts on nickel steel. You can see these many places, but in

almost any automobile or aeroplane plant for certainty.

Made in 9/16", 1", 1 1/2" and 2" sizes.

No stronger, more durable, more accurate Die Head was ever made.

Ask for Catalog

Eastern Machine
Screw Corp.

New Haven - Conn.

on
Nickel
Steel



"HIGH ABOVE
THE ORDINARY"

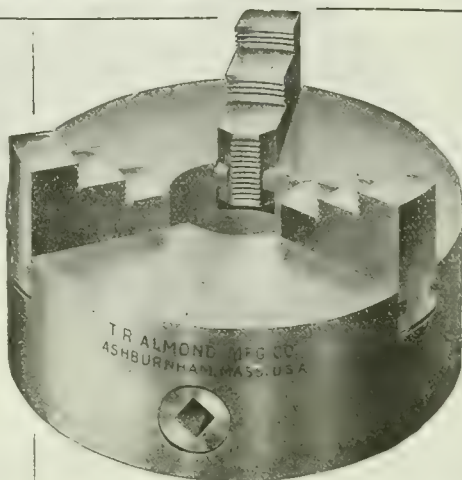
JACOBS
IMPROVED DRILL
CHUCKS

A successful product can never long be hidden in a cloud of obscurity. The Jacobs chuck flashed into fame years ago. Each year more firmly establishes its ascendancy. Its record of continuous satisfactory service is due to its conceded superiority.

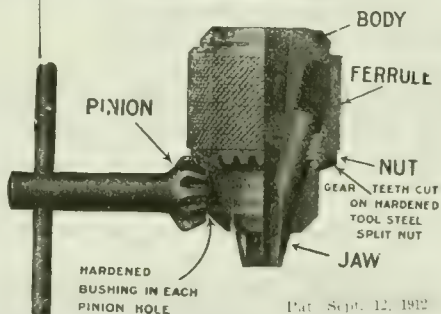
THE JACOBS TOOL CO. HARTFORD CONN. U.S.A.

ALMOND CHUCKS & MICROMETERS

Give them
a try out.
Universal
Geared
Scroll
Chuck—
Sizes 5",
6", 7 $\frac{1}{2}$ ", 9"
and 12".



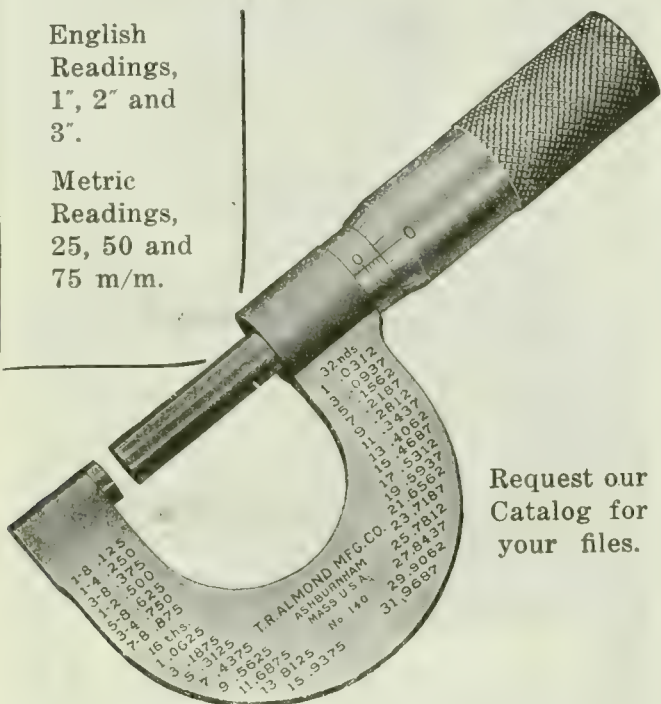
Geared
Nut Drill
Chucks, in
various
capacities,
0" to 1".



Micro-
meter
Calipers—

English
Readings,
1", 2" and
3".

Metric
Readings,
25, 50 and
75 m/m.

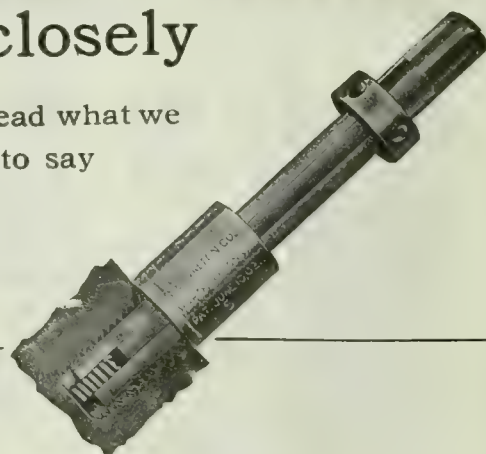


Request our
Catalog for
your files.

T. R. ALMOND MFG. CO.
6 Maple Avenue, Ashburnham, Mass.

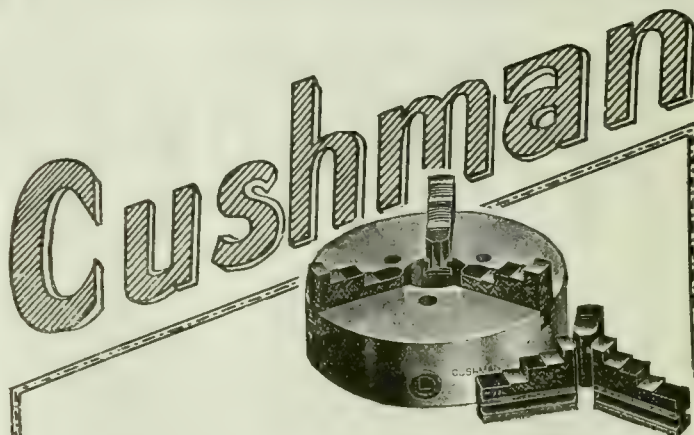
Look at this again —closely

and read what we
have to say
below



WHEN a tap breaks off close or below the surface, you'll find this Walton Tap Extractor will save a great deal of time and trouble. The crucible fingers grasp the flutes of the tap, a twist of the wrench and the piece is out. Don't you think it would pay to have a few lying around on your benches?

The Walton Company
Hartford, Conn.



**The "Cushman" Chuck of to-day
is the fruit of nearly sixty years
of Chuck building**

And right from the start in 1862, they have been known throughout the industry for their high quality Material and Workmanship.

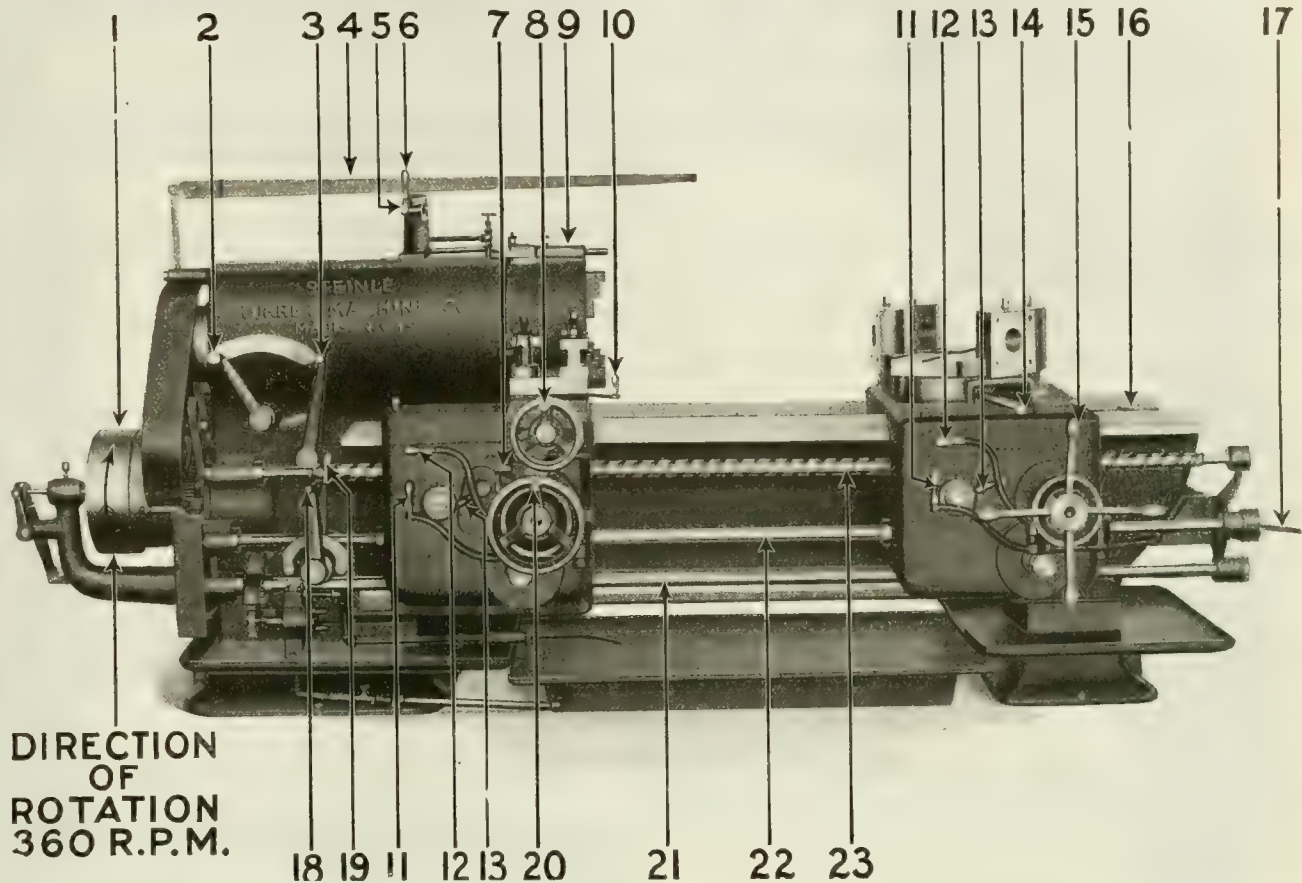
The CUSHMAN Chuck of to-day embodies every up-to-date improvement of a long line of FAMOUS CHUCKS.

Send for our Catalogue showing complete line of Lathe Chucks, Drill Chucks and Portable Face Plate Jaws.

Cushman Chuck Co., Hartford, Conn.

CHUCKS

STEINLE



THE STEINLE 24" FULL SWING SIDE CARRIAGE TURRET LATHE

This machine has thirty reversible spindle speeds, a wide range of carriage and turret feeds independent as to rate and direction, a wide screw cutting range and independent power traverse for both carriages. All of these functions are controlled by conveniently located levers shown by numbers.

No. 1 Driving pulley 16" diameter for 5" belt. This one belt furnishes power for operating all functions of machine.

No. 2 Lever governing ratio of first train of gears.

No. 5 Lever for engaging back gearing.

No. 6 Lever for engaging triple gearing.

Nos. 18 and 19 Levers for manipulating change speed mechanism which, operating in connection with the three gear ratios and positive reverse motion, give thirty reversible spindle speeds.

No. 3 Lever for operating quick change gear feed box.

No. 8 Hand feed for cross slide on side carriage.

No. 7 Engages power cross feed of slide on side carriage.

No. 20 Hand travel of side carriage.

No. 10 Locking lever for turret tool block on side carriage cross slide.

No. 15 Hand travel of turret.

No. 14 Turret locking lever.

No. 16 Location stops for turret.

No. 12 Lever for operating independent quick change power longitudinal feed on both carriages.

No. 13 Feed reverse on both carriages.

No. 11 Lever for operating independent power traverse on both carriages.

No. 17 Knock out for power traverse of turret; similar provision is made for knocking out power traverse of side carriage at head end of machine, this mechanism being hidden from view.

No. 9 Removable oil guard over chuck.

No. 21 Power traverse shaft.

No. 22 Feed shaft.

No. 23 Lead screw.

There are sound mechanical reasons resulting from long turret lathe experience back of every point in the above design. Let us tell you about them.

STEINLE TURRET MACHINE COMPANY

MADISON, WISCONSIN,

::

::

U.S.A.

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The PHOTOSTAT

(Trade Mark Registered)

The Photographic Copying Machine produces

Clear

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Perfect

Permanent

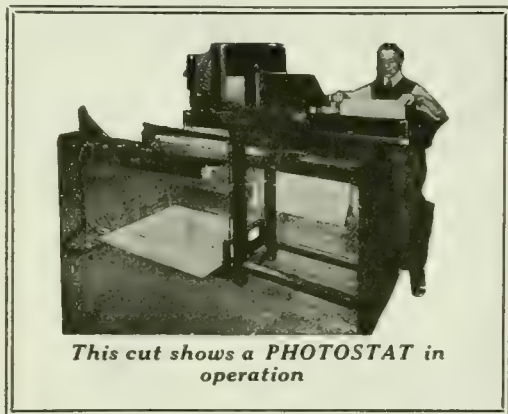
Facsimiles

Why spend time and money with old methods when the PHOTOSTAT does better work in a fraction of the time at less cost?

The Westinghouse Lamp Company say: "Photographic copying, as we discovered two years ago, is a wonderfully efficient process, not only for all sorts of work that formerly required detailed tracing, but for important documents where identical copies are needed, and in fact, wherever quick reproduction is necessary.

"Our analysis shows that where it formerly required a skilled draftsman approximately five to six days to trace from a blue print in order to make more blue prints, our photographic copying machine—the Photostat—can reproduce the same work in 15 minutes, and with absolute accuracy, as this device catches every item, whereas a draftsman is liable to omit a line.

"Reduction of large drawings to letter size or enlargement of small ones is an important advantage. The machine, as is indicated by the figures above, soon pays for itself in time and salary saved—but what is more important, is its ability to speed up our production."



This cut shows a PHOTOSTAT in operation

Copy Your Own

Pencil Drawings
Ink Drawings
Tracings
Reports
Shipping Lists
Specifications
Blue Prints
Sketches

Maps
Letters
Telegrams
Documents
Data Sheets
Contracts
Records
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Illustrations for Salesmen
Drawings for Advertising

Copies made direct upon paper.

and developed and fixed right in the machine itself.
No expert knowledge required.

The PHOTOSTAT is manufactured by the Eastman Kodak Company exclusively for the

COMMERCIAL CAMERA COMPANY

343 State Street, Rochester, N.Y.

Chicago, Ill.

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New York, N.Y.

Providence, R.I.

Washington, D.C.

AGENCIES:

ALFRED HERBERT, LTD., COVENTRY, ENGLAND
SOCIETE ANONYME ALFRED HERBERT, PARIS, FRANCE
SOCIETA ANONIMA ITALIANA ALFRED HERBERT, MILANO, ITALY
GRAHAM BROTHERS, STOCKHOLM, SWEDEN

ARMCO IRON WELDING RODS



The trade mark ARMCO carries the assurance that iron bearing that mark is manufactured by the American Rolling Mill Company with the skill, intelligence and fidelity associated with its products, and hence can be depended upon to possess in the highest degree the merit claimed for it.

THE old theory that successful welding necessitates a choice of one from many compositions of welding rods was based upon the assumption that welding rods should have exactly the same composition as the material to be welded.

Experience has shown this to be wrong. Seldom is it possible or practical to determine the exact composition of the material to be welded, and even if it were, the melting of the rod and metal in the presence of surface impurities, gases from the torch, etc., so alters the original filler composition that its *true* welding value is *not* the theoretical.

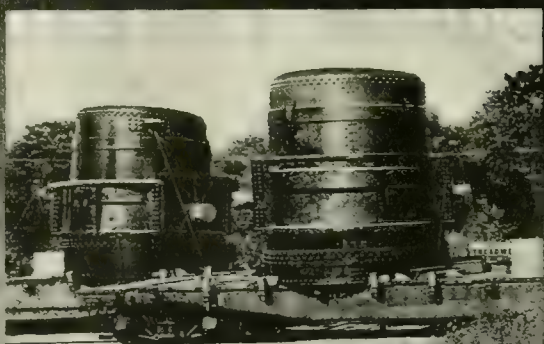
The chemists, metallurgists and research engineers of the American Rolling Mill Co., and the Page Steel and Wire Co., spent years of profound study and experiment in determining the exact conditions existing and the transformations taking place. Their results and actual commercial experience in welding have proven that one composition of rod in *two tempers*, one for oxy-acetylene and another for electric welding, meets every requirement.

The advantage of using Armco Iron Welding Rods of a single composition in two tempers—is obvious. A shop doing general welding

work, instead of having to carry stocks of many compositions, can meet all requirements from a small stock of Armco Iron Rods that takes up small space and involves only a small investment.

Give Armco Iron Welding Rods at least a trial, and you will be pleased with the first cost, ease of manipulation and reliability of the finished work.

Ask for our book
"Armco Welding Rods"



Steel mill ladles welded with Armco Iron Welding Rods

PAGE STEEL & WIRE CO.

Established 1883 as Page Woven Wire Fence Co.



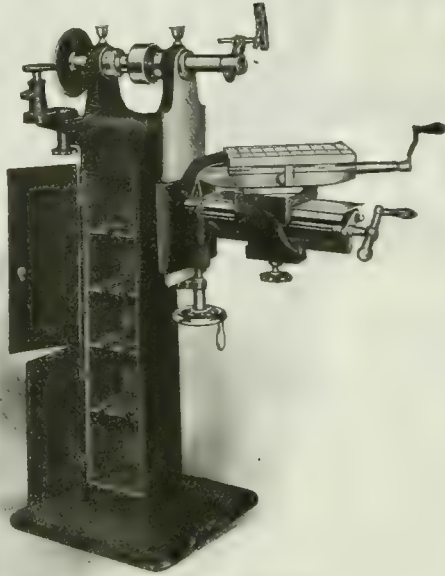
Makers of "Copperweld" Copper Clad Steel Wire; ARMCO Iron Welding Rods and Electrical Wire; Wire Mill Products, Plain and Galvanized; Wire of Special Analysis; Wire Fencing for all Purposes; Factory Gates; Ornamental Iron Fence; Machine Guards; Tool and Stockroom Partitions; Architectural Iron.

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Use Code—Banish

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The spindle is hardened and ground and supported out close to the wheel by an extended bearing, and carefully protected from emery.

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Machine is designed to keep its original factory accuracy.

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The probability is two to one that it's a

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that's on the job.

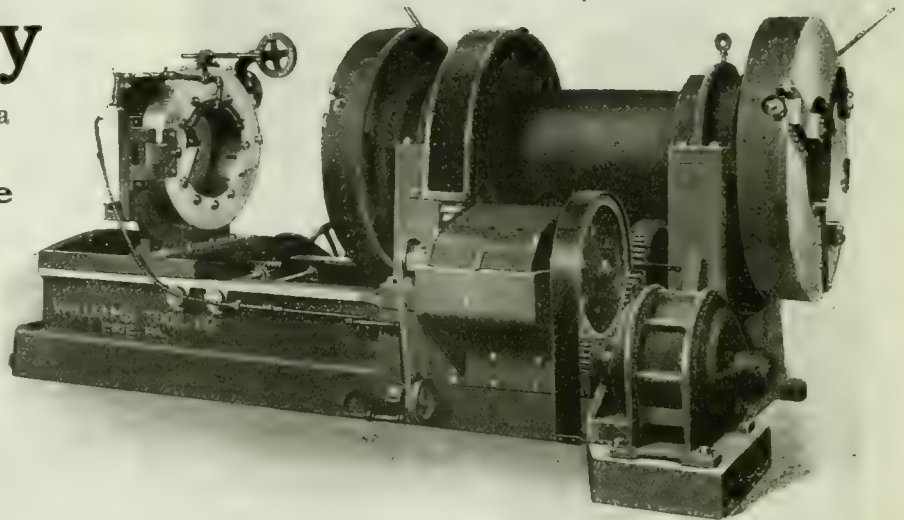
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Two speeds—in one minute milling 2 to 12 inches or turning 15 to 30 feet.

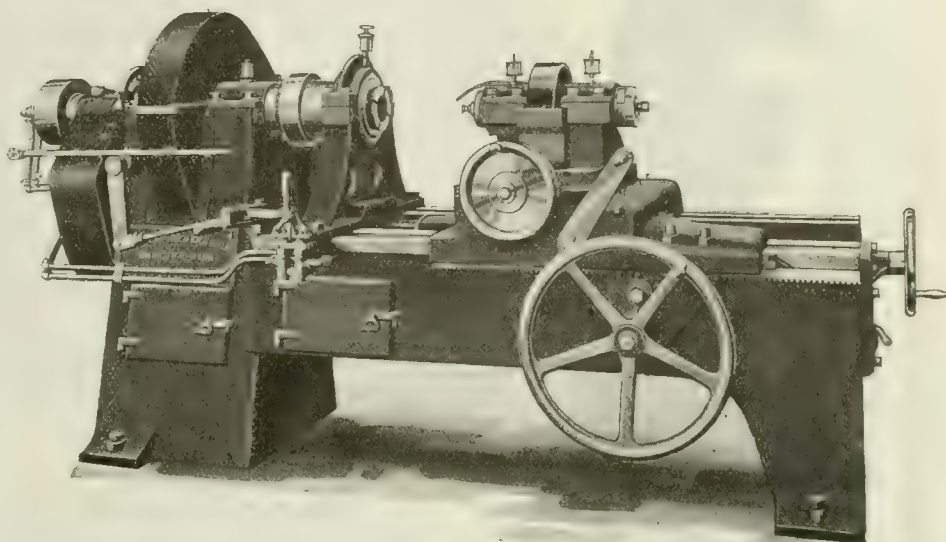
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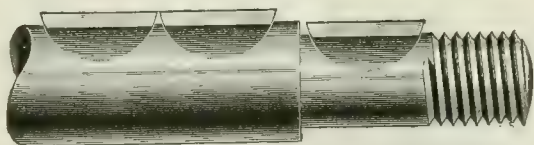
Smalley General Co., Inc.
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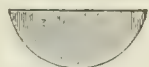
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guarantees perfect work at less than half the ordinary expense.

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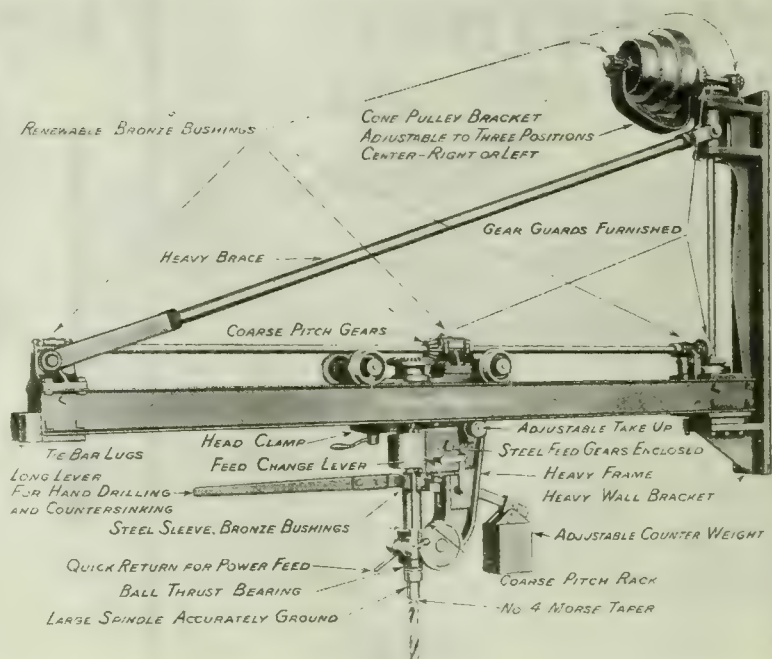
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MADE IN FOUR STANDARD SIZES

Rated size	Drills to center of	Wall to end of arm
7 ft.	14 ft. circle	10 ft.
9 ft.	18 ft. circle	12 ft.
11 ft.	22 ft. circle	14 ft.
13 ft.	26 ft. circle	16 ft.

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The Canadian No. 5 has some features worth considering.

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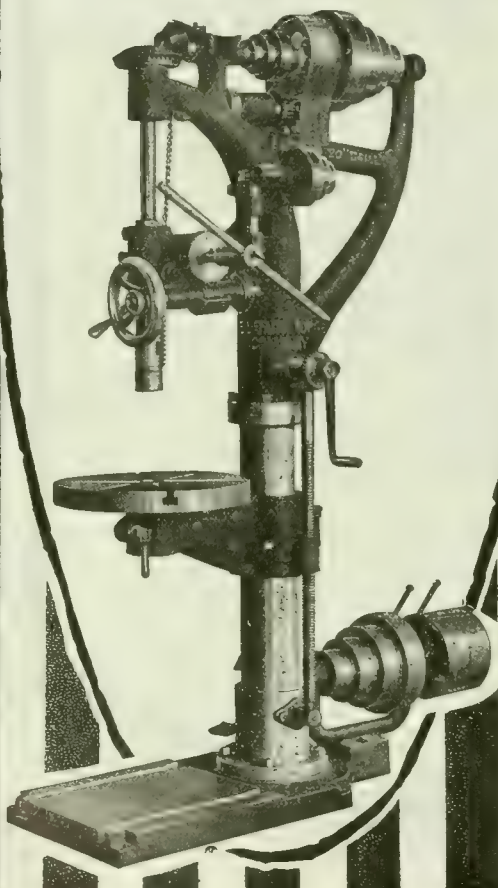
The twist of a knurled knob changes instantly plain drive to back geared drive—no tools to get lost or bother with.

An adjustable automatic trip throws out power feed when piece has been drilled to required depth.

Split adjustable bearings, ball bearing graduated spindle—but then there are so many features—for complete description write for literature.

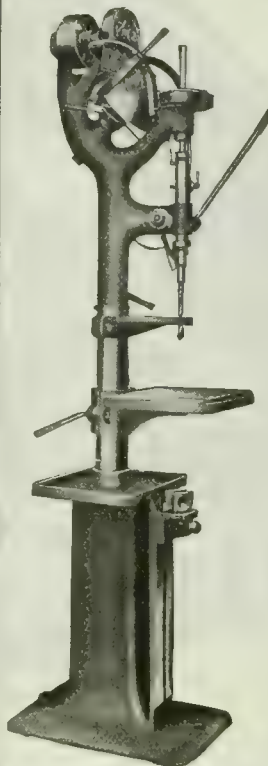
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Canadian Blower & Forge Co., Limited
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Can Ship at Once

Your Albany High Speed Tool Room Drill



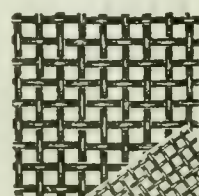
It is ready for immediate use, and you can use it immediately, at any speed from 268 to 2140.

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This is really a wonderful machine of the highest grade construction throughout, and absolutely guaranteed in every way. It will be a pleasure to send full description; ask for it.

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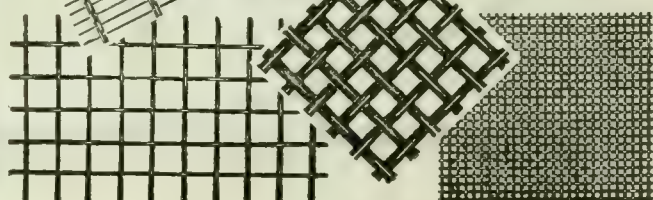
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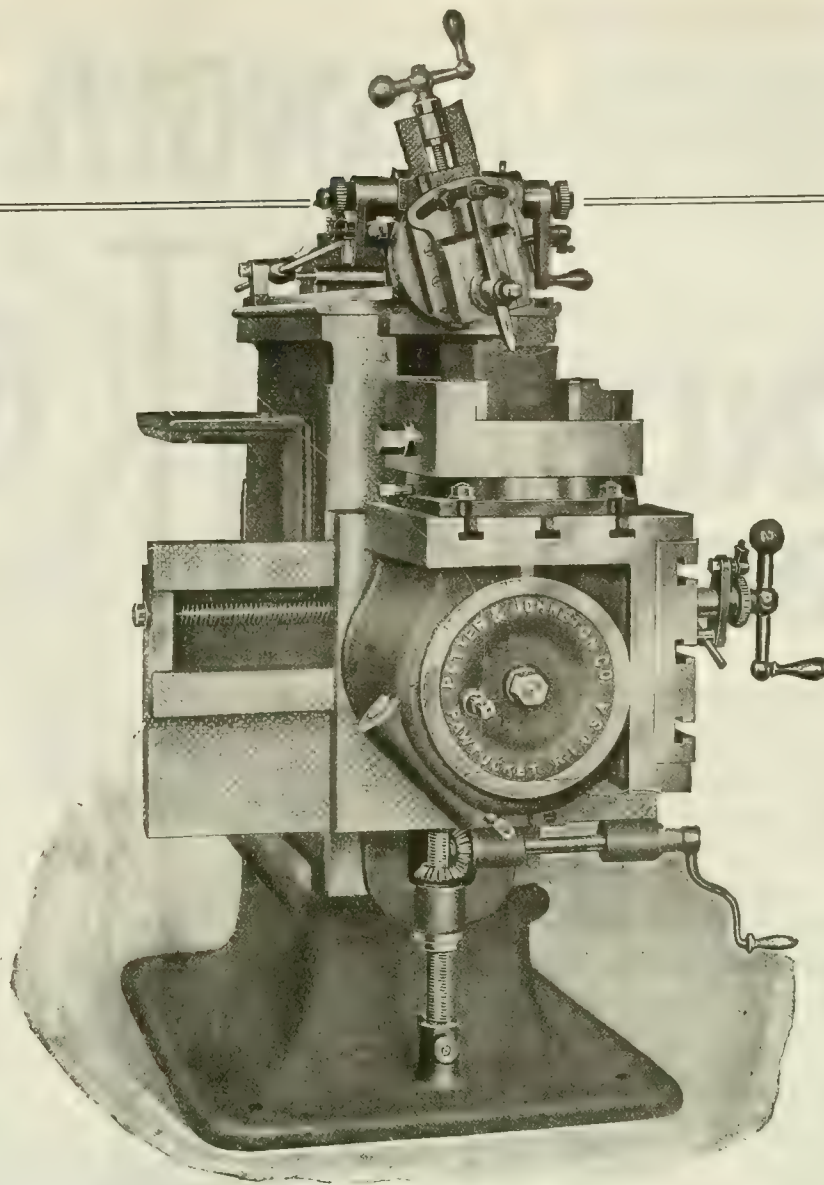
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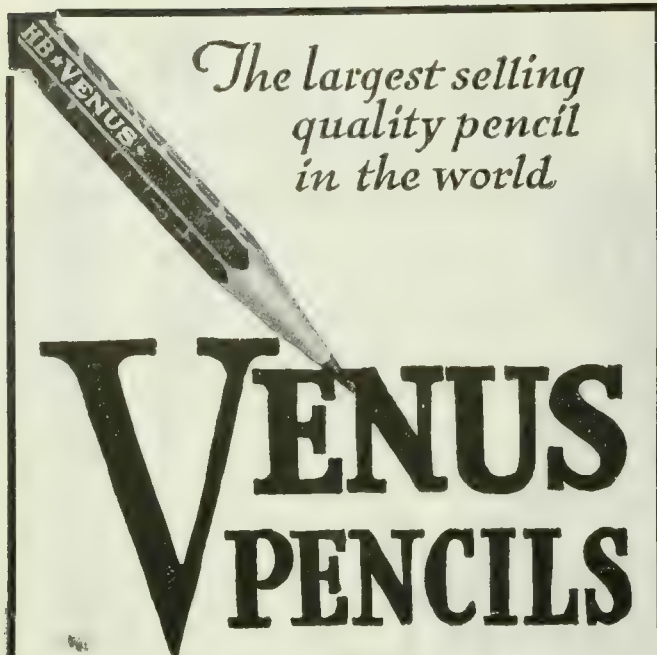
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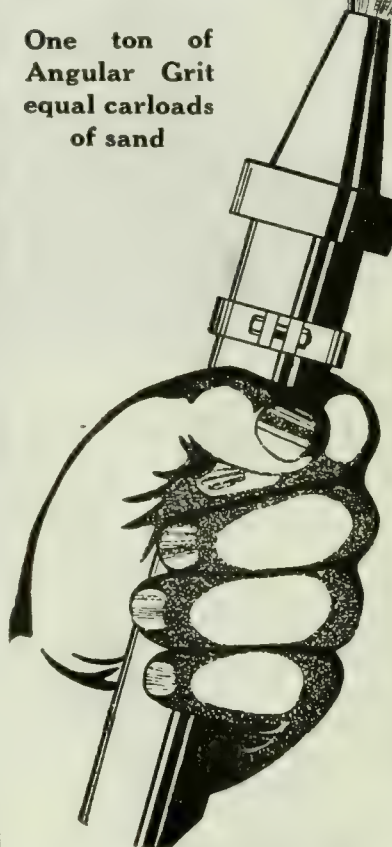
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Gang Drills.—Horizontal Drills.

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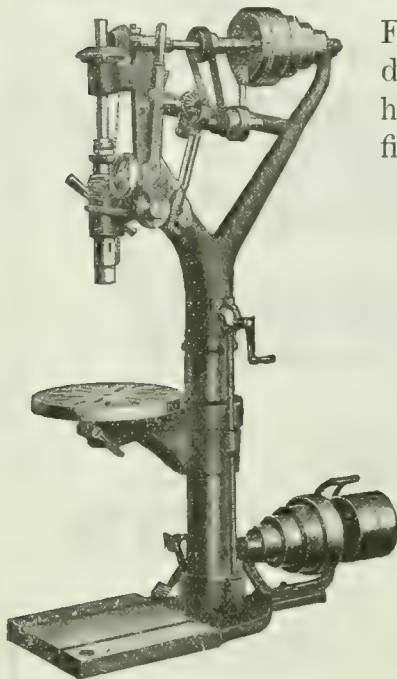
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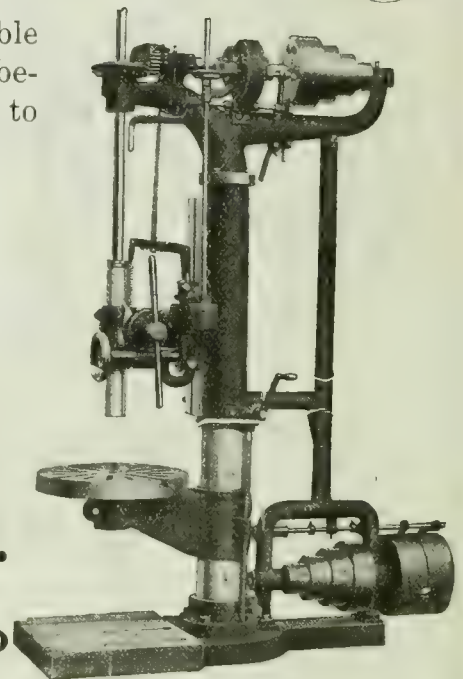
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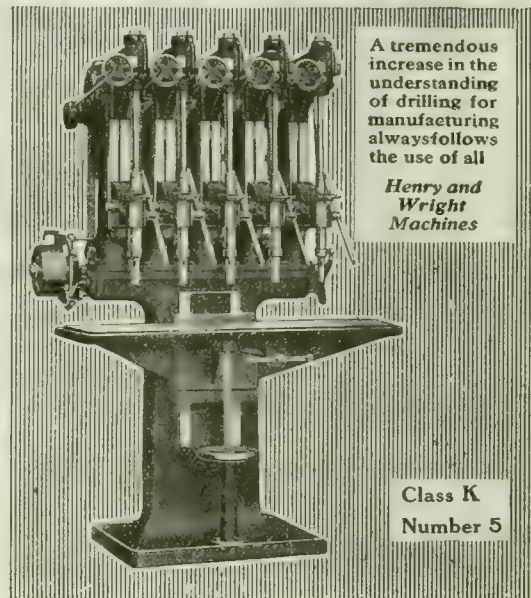


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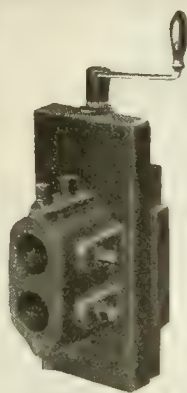
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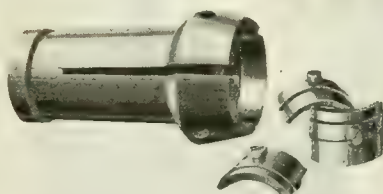
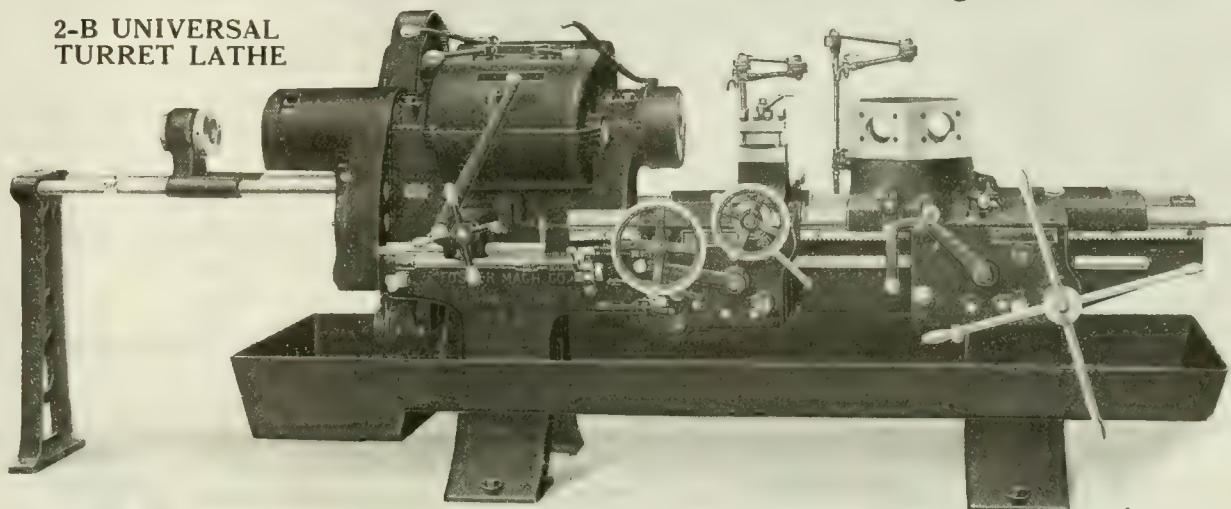
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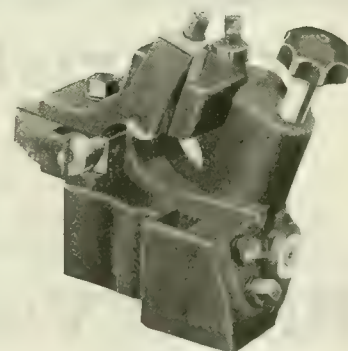
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Manufactured under the Holden & Morgan Patents

This is the equipment that you need to reduce your production cost to a minimum now that the war is over and the time of keen competition is here once more.

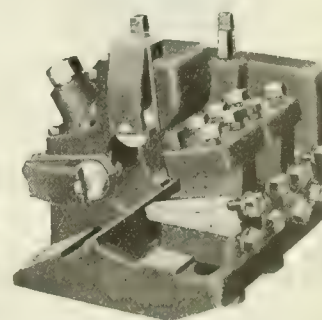
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Taper Attachment



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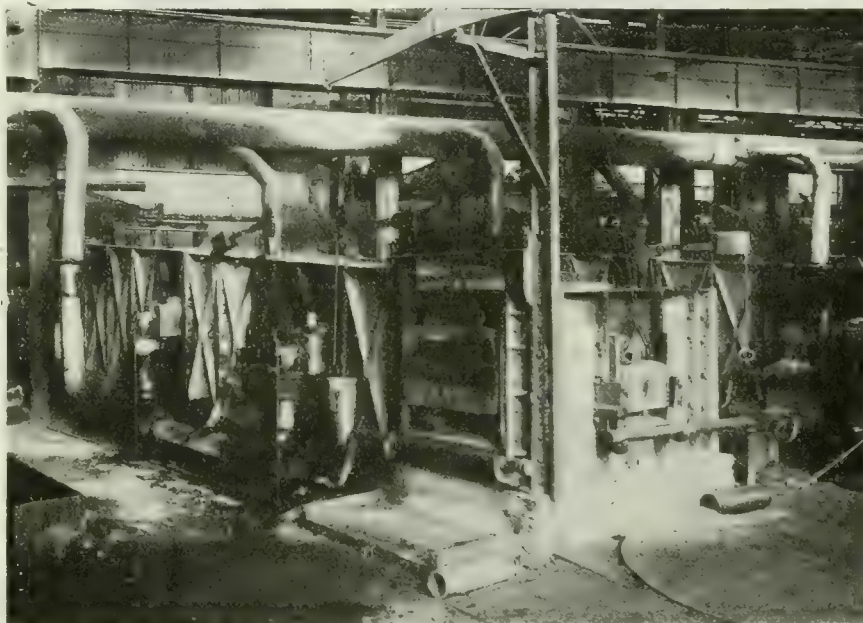
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demonstrated its superior features point by point to a group of men whose years of experience in the heat-treatment of metals made them appreciative

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Our intimate knowledge of heat-treating methods, and our long experience in the building of efficient furnaces fit us to give helpful advice—and that we will do promptly if you

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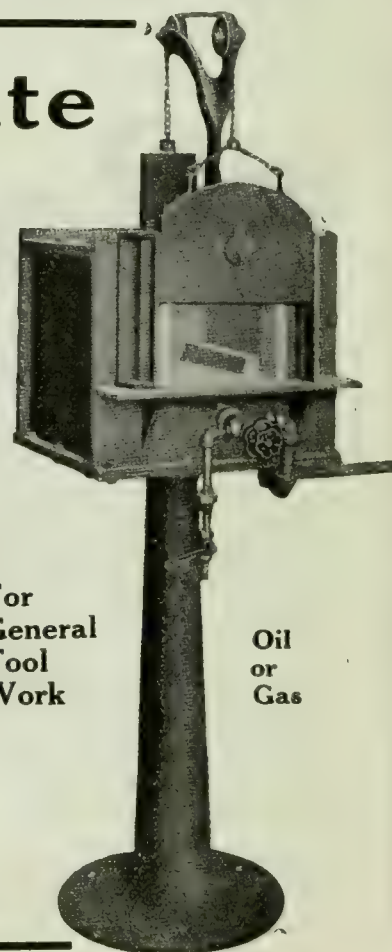
Let us advise you about your heat-treating problems.

Bellevue Industrial Furnace Company

Julius C. Hinz, President

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Oil
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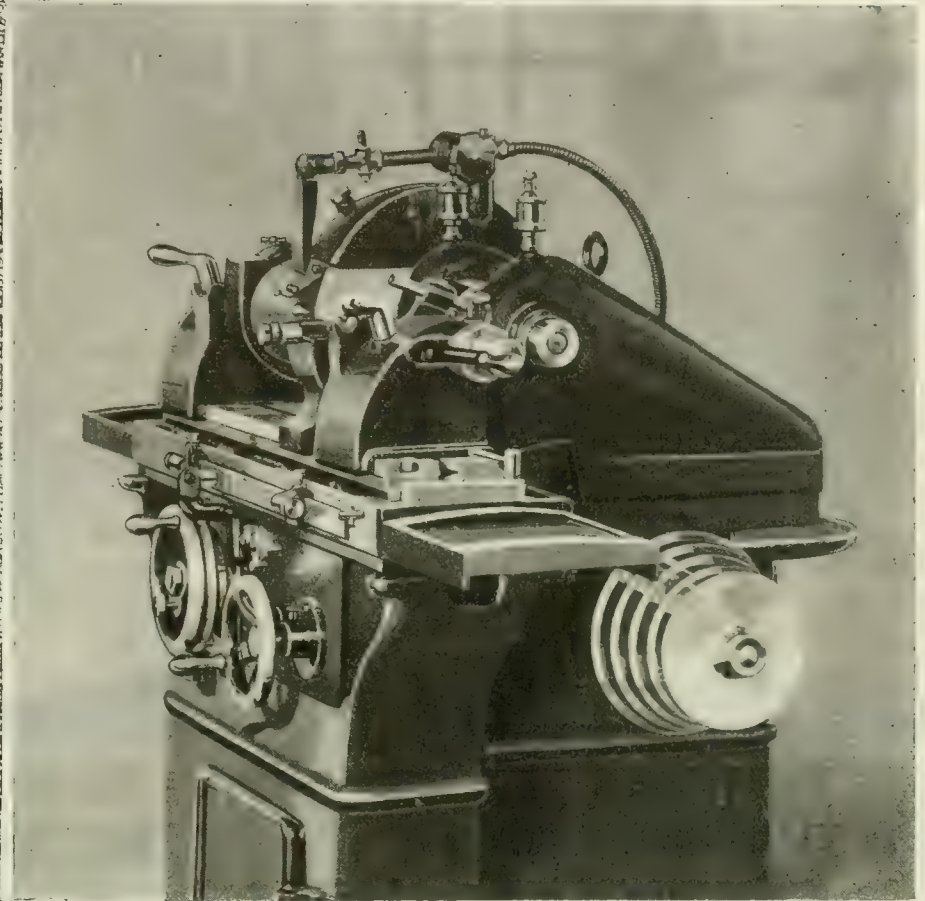


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It has automatic feeds, bearings of Non-Grain Metal, large self-feeding oilers and Hyatt roller bearings on the countershaft. It is especially adapted for the rapid and economical production of large quantities of small duplicate, straight or taper cylindrical parts requiring close limit grinding.

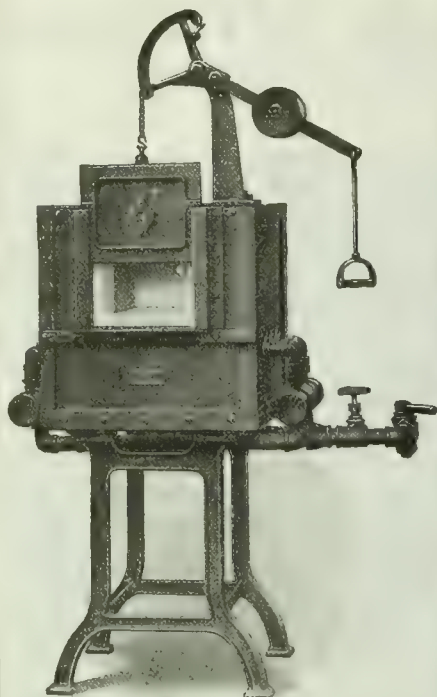
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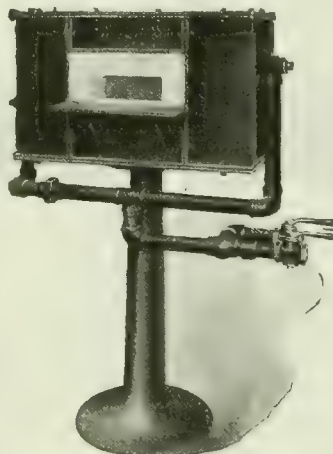


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*Immediate delivery on
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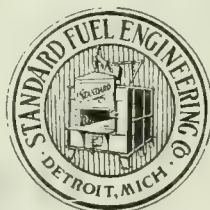
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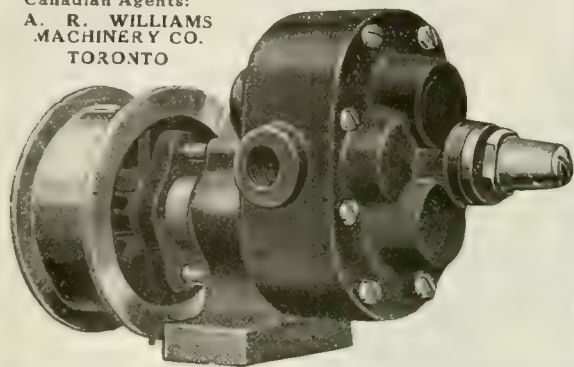
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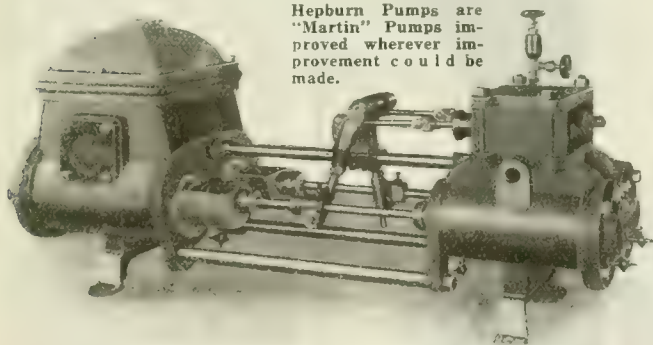
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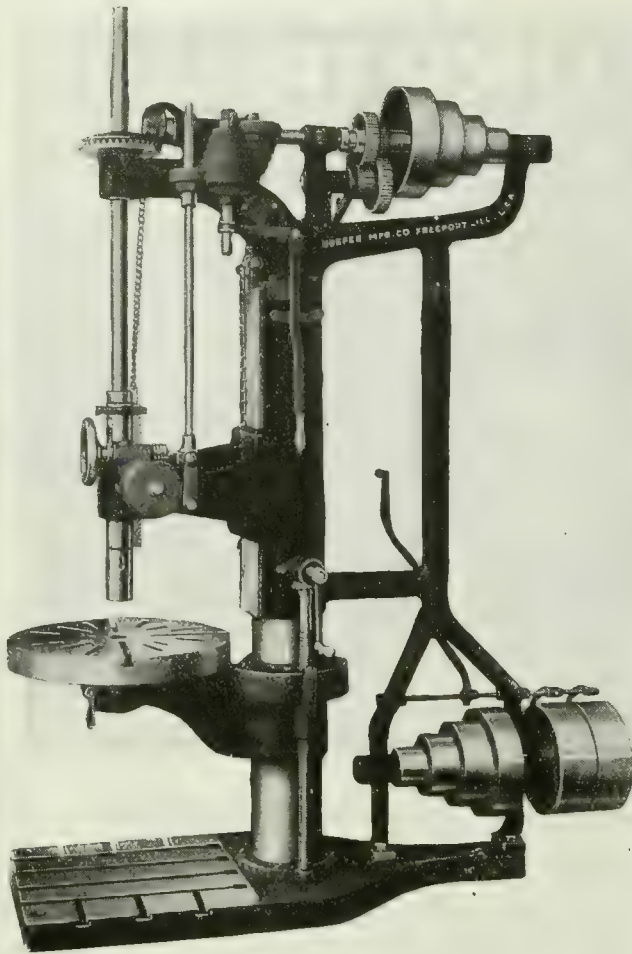
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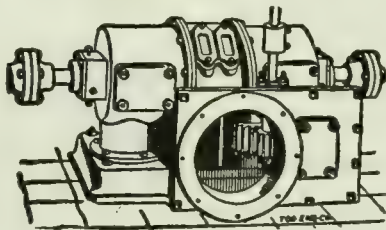
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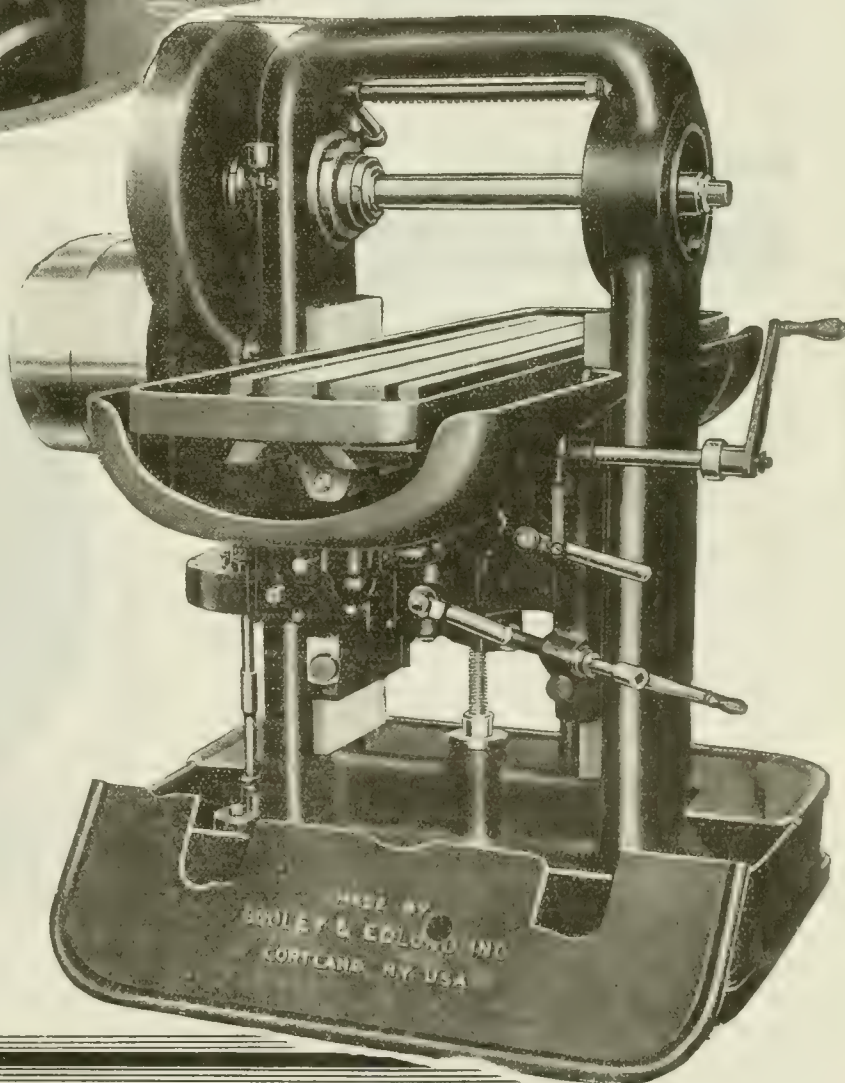
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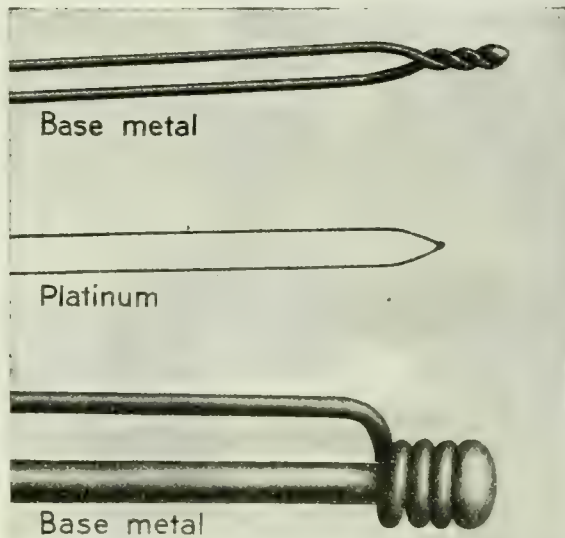


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Avoid the expense of platinum and at the same time secure greater mechanical strength and more constant electrical qualities.



The present excessive cost of platinum makes it more advantageous than ever to use Thwing Base-Metal Thermocouples for measuring temperatures below 1300° C. (2400° F.).

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Ask for references, performance data, and prices.

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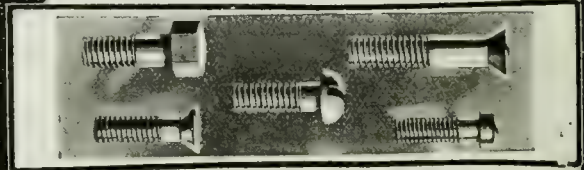
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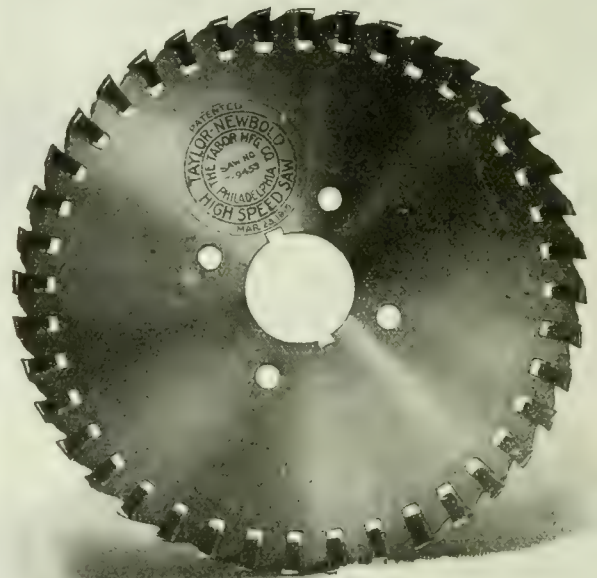
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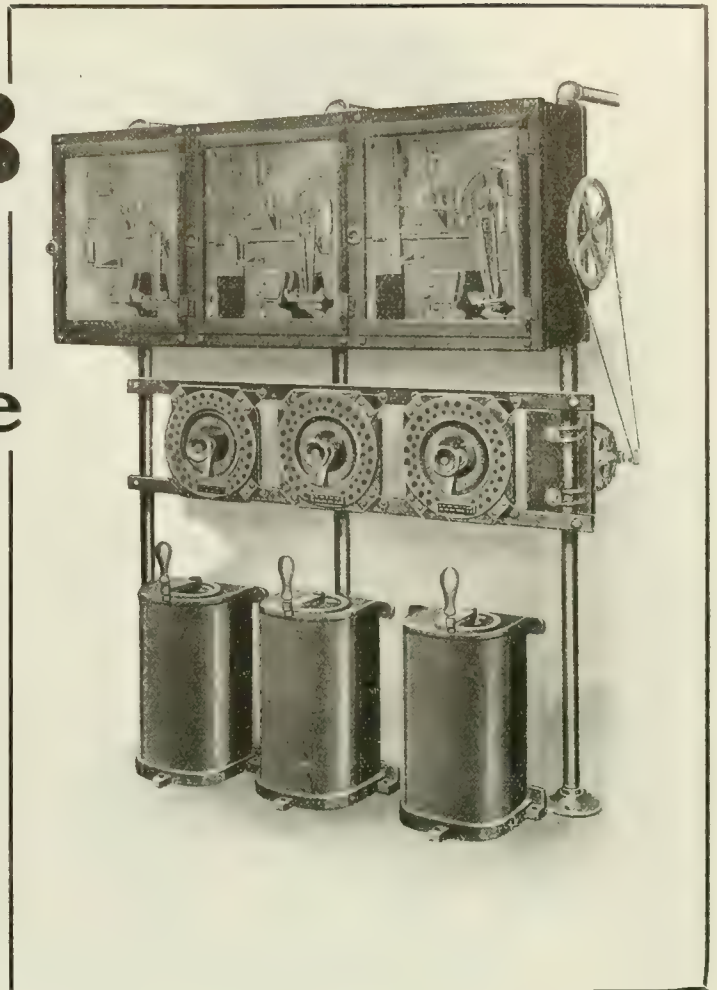
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It allows of a wide range of power being used, so necessary in the melting or refining of steel.

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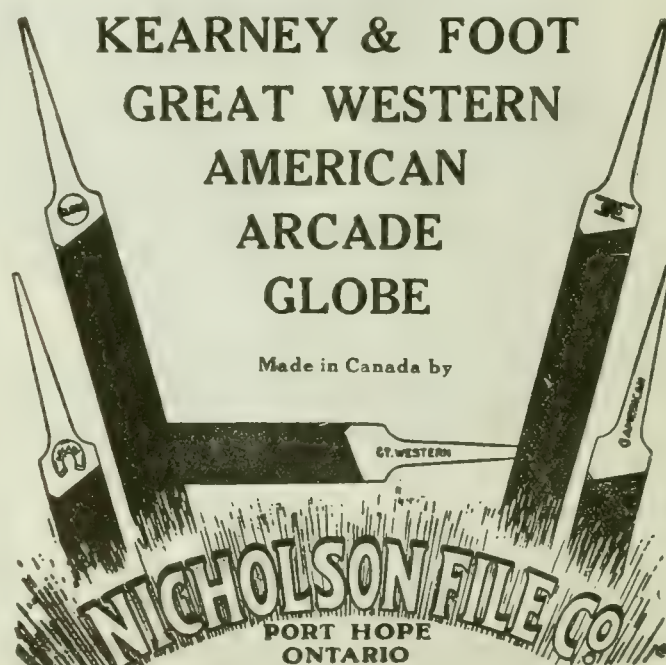
It's Their Time *But* It's Your Money

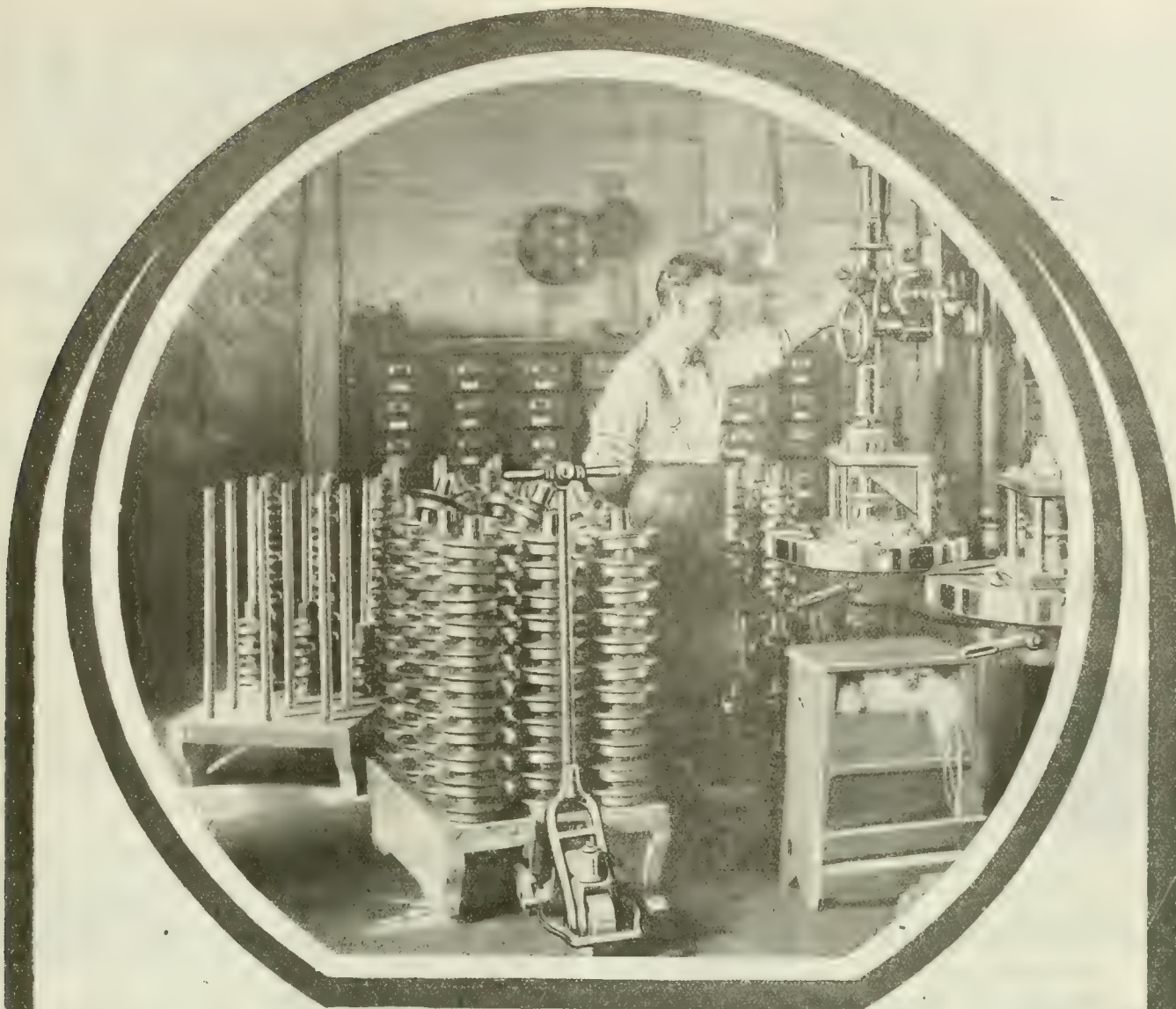
A man with a sharp file will work faster than a man with a dull file; and he'll be more contented and less tired at the end of the day.

The cost of a new file as a rule is less than one hour's wasted time. You gain, therefore, by telling men to turn in files when they have passed their efficient point. You also gain by ordering Famous Five Files. They give long and efficient service.

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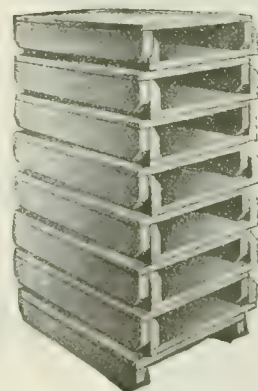
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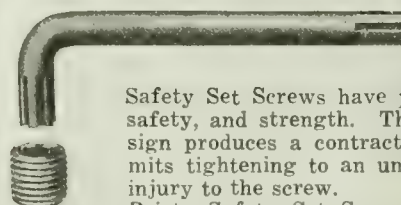


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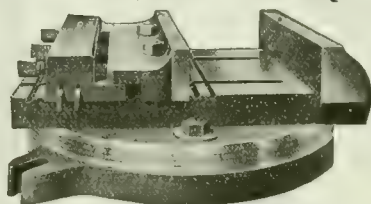
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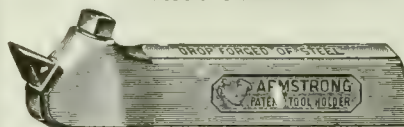
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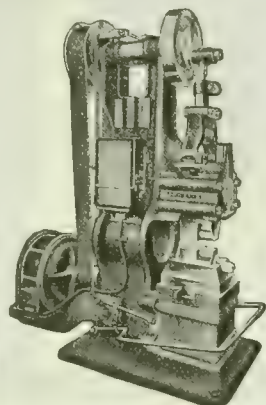
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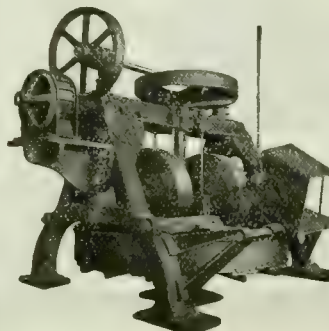
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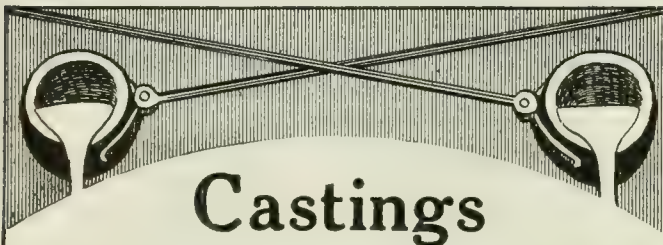
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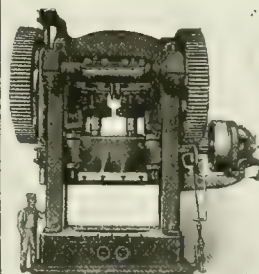
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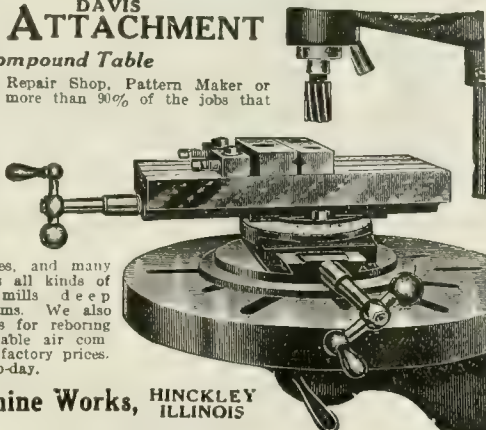
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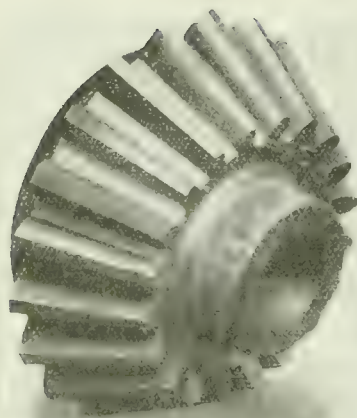
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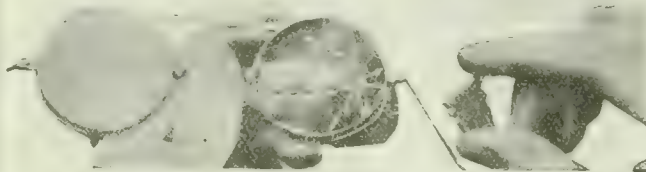


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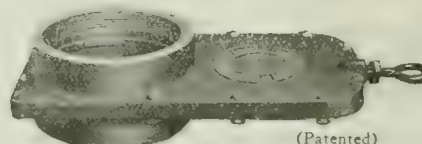


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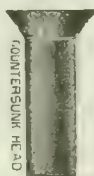
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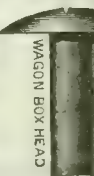
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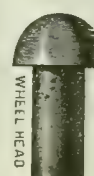
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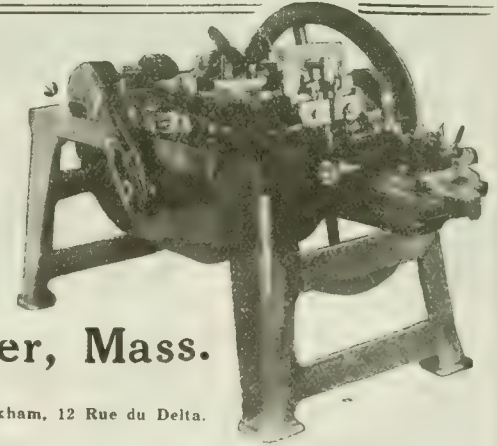
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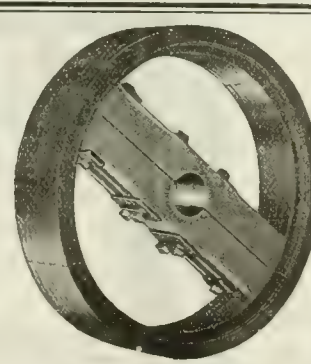
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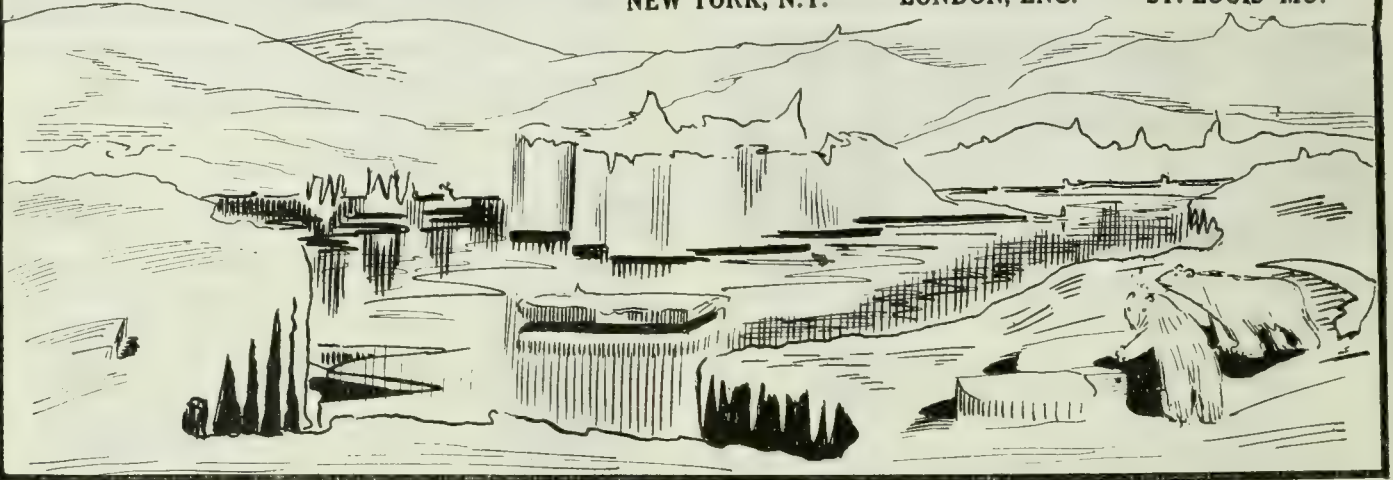
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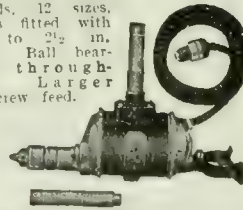
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 Garlock-Walker Machinery Co., Toronto, Ont.
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 Sheldons, Limited, Galt, Ont.
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 Greenleafs, Ltd., Belleville, Ont.
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 Tallman Brass & Metal Co., Hamilton.
 United Brass & Lead Ltd., Toronto.
 Wentworth Mfg. Co., Hamilton, Ont.

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Gardner & Son, Robt., Montreal.

Greenleafs, Ltd., Belleville, Ont.

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CASTINGS, HARDWARE

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Pine Lewis & Son, Toronto, Ont.

Williams & Wilson, Limited, Montreal, Que.

Wright Mfg. Co., Lisbon, Ohio.

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Morse Chain Co., Ithaca, N.Y.

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J. F. A. Comstedt, New York City, N.Y.

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 Bertram & Sons Co., John, Dundas.
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 Cushman Chuck Co., Hartford, Conn.
 Foss Mch. & Supply Co., The Geo. F., Montreal.
 Gardner, Robt., & Son, Montreal.
 Garlock-Walker Machinery Co., Toronto, Ont.
 Gisholt Machine Co., Madison, Wis.
 Harding Bros., Chicago, Ill.
 Jacobs Mfg. Co., Hartford, Conn.
 Ker & Goodwin, Brantford.
 Knight Metal Products, Ltd., Toronto, Ont.
 Modern Tool Co., Erie, Pa.
 Rice, Lewis & Son, Toronto, Ont.
 Skinner Chuck Co., New Britain, Conn.
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 Williams & Wilson, Limited, Montreal, Que.

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 Whitney Mfg. Co., Hartford, Conn.

CHUCKS, FRICTION AND TAP

Victor Tool Co. of Canada, Galt, Ont.

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Heald Machine Co., Worcester, Mass.
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CHUCKS, RING WHEEL

Ford-Smith Mach. Co., Hamilton, Ont.

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CHUCKS, WRENCH

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 New Britain Machine Co., New Britain, Conn.
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 Niles-Bement-Pond Co., New York.
 Roelofson Machine & Tool Co., Toronto, Ont.
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 Wood Turret Mach. Co., Brazil, Ind., U.S.A.
 Williams & Wilson, Limited, Montreal, Que.

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Bowser & Co., S. F. Inc., Fort Wayne, Ind.
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CLEANING COMPOUND

Oakley Chemical Co., New York.

CLOCKS, WATCHMAN, PORTABLE

Gisholt Machine Co., Madison, Wis.

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Jones & Glasco, Montreal, Que.

CLUTCHES, FRICTION AND PULLEY

Bernard Industrial Co., A. Fortierville, Que.

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Carlyle Johnson Mach. Co., Manchester, Conn.

Jones & Glasco, Montreal, Que.

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 MacGovern & Co., Montreal, Que.
 MacKinnon Steel Co., Sherbrooke, Que.
 Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
 Northern Crane Works, Ltd., Walkerville, Ont.
 Whiting Foundry Equipment Co., Harvey, Ill.
 Williams & Wilson, Limited, Montreal, Que.

COILING MACHINERY, WIRE AND SPRING

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Hanna & Co., M. A., Cleveland, O.

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Can. Blower & Forge Co., Kitchener, Ont.
 Sheldons, Limited, Galt, Ont.
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Becker Milling Machine Co., Boston, Mass.
 Handing Co., Inc., Chicago, Ill.
 Wilson & Co., J. C., Belleville, Ont.

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Brown's Copper & Brass Rolling Mills, New Toronto.

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United Brass & Lead Ltd., Toronto.

COMBINED OPEN SIDE PLANNER-SHAPER

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 Garlock-Walker Machinery Co., Toronto, Ont.
 Hincley Machine Co., Hincley, Ill.
 MacGovern & Co., Montreal, Que.
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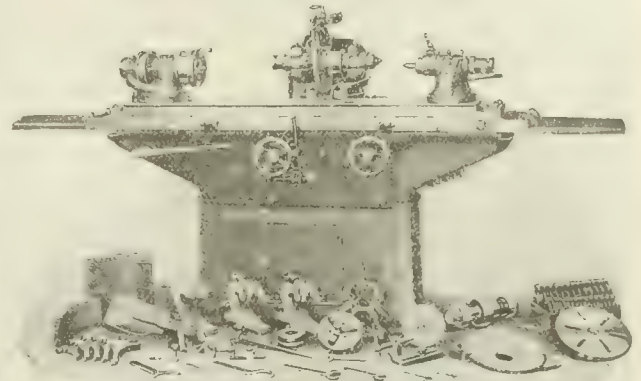


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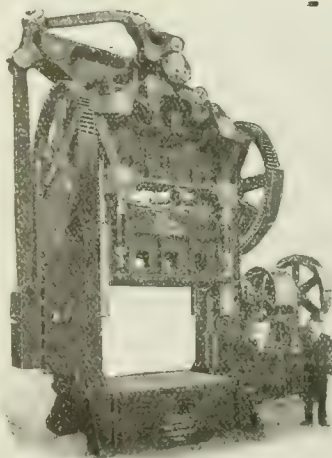
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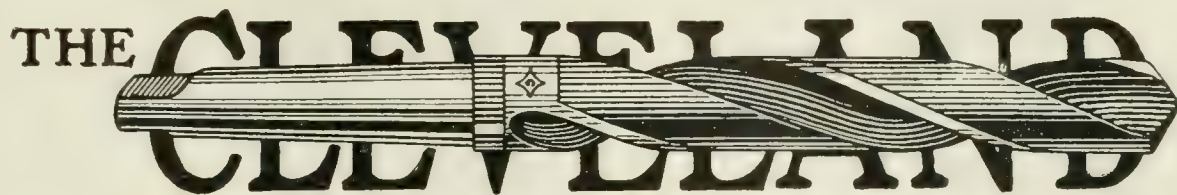
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EXHAUST HEADS AND HOODS

Can. Blower & Forge Co., Kitchener, Ont.

Canadian Fairbanks-Morse Co., Montreal.

Sheldons, Ltd., Galt, Ont.

EXHAUSTERS

Can. Blower & Forge Co., Kitchener, Ont.

Pangborn Corporation, Hagerstown, Md.

Sheldons, Ltd., Galt, Ont.

Williams & Wilson, Limited, Montreal, Que.

EXTRUSION DIE STEEL

J. F. A. Comstedt, New York City, N.Y.

EXTRACTORS, TAP

Walton Co., The, Hartford, Conn.

EXTRA TOOL STEEL

J. F. A. Comstedt, New York City, N.Y.

EYE BOLTS AND NUTS

Can. Foundries & Forgings, Ltd., Welland, Ont.

United Brass & Lead, Ltd., Toronto.

FACTORY GATES

Page Steel & Wire Co., Adrian, Mich.

FANS

Baird Machine Co., Bridgeport, Conn.

Can. Blower & Forge Co., Kitchener, Ont.

Sheldons, Ltd., Galt, Ont.

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Page Steel & Wire Co., New York, N.Y.

Williams & Wilson, Limited, Montreal, Que.

FENCE, IRON AND FACTORY

Canada Wire & Iron Goods Co., Hamilton, Ont.

Page Steel & Wire Co., Adrian, Mich.

FERRO-TUNGSTEN

Vanadium-Alloys Steel Co., Pittsburgh, Pa.

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Aikenhead Hardware Co., Toronto, Ont.
Atkins & Co., Wm., Sheffield, Eng.
Delta File Works, Philadelphia, Pa.

Ingersoll File Co., Ltd., Ingersoll, Ont.

Marshall & Co., Geo., Toronto, Ont.

Nicholson File Co., Port Hope, Ont.

Rice Lewis & Son, Toronto, Ont.

Simonds Mfg. Co., Pittsburg, Mass.

Standard Mach. & Supplies, Ltd., Montreal, Que.

Wilkinson & Kompass, Hamilton, Ont.

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Bowser & Co., S. F. Inc., Fort Wayne, Ind.

Canada Wire & Iron Goods Co., Hamilton, Ont.

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Hilmas Tool Works, Chicago, Ill.

Marten Machine Co., Hamilton, Ontario.

Toronto Tool Co., Toronto, Ont.

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Sleeper & Hartley, Inc., Worcester, Mass.

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Wickes Bros., Saginaw, Mich.

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Can. Blower & Forge Co., Kitchener, Ont.

A. B. Jardine & Co., Ltd., Hespeler, Ont.

Rice Lewis & Son, Toronto, Ont.

Sheldons, Ltd., Galt, Ont.

FORGINGS, STEEL AND IRON

Can. Foundries & Forgings, Ltd., Welland, Ont.

Nova Scotia Steel & Coal Co., New Glasgow, N.S.

FORGINGS, DROP, AUTOMOBILE AND LOCOMOTIVE

FORGING AND WELDING

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Can. Billings & Spencer, Ltd., Welland, Ont.

Dominion Bridge Co., Montreal, Que.

Dom Forge & Stamping Co., Walkerville, Ont.

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

Steel Co. of Canada, Ltd., Hamilton, Ont.

Whitman & Barnes Mfg. Co., St. Catharines, Ont.

Williams & Co., J. H., Brooklyn, N.Y.

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John Bertram & Sons Co., Dundas.

Bliss, E. W., Co., Brooklyn, N.Y.

Brown, Boggs Co., Ltd., Hamilton, Ont.

Canada Machinery Corp., Galt, Ont.

Garlock-Walker Machinery Co., Toronto, Ont.

National Machinery Co., Tiffin, Ohio.

Williams & Wilson, Limited, Montreal, Que.

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Armstrong, Whitworth of Canada, Montreal, Que.

Canada Foundries & Forgings, Ltd., Welland, Ont.

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Graton & Knight Mfg. Co., Montreal.

FRICITION SURFACE BELTING

Can. Consolidated Rubber Co., Ltd., Montreal.

FUEL OIL SYSTEMS

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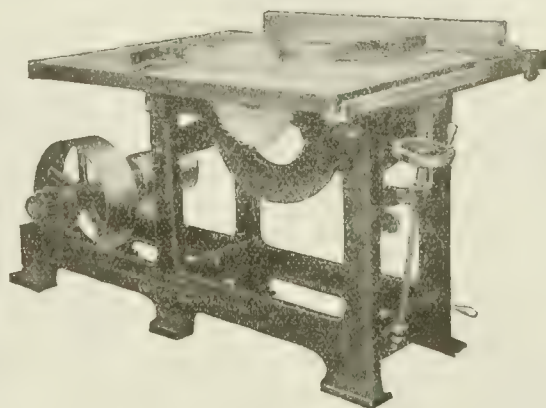
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"Treat Your Machine as a Living Friend"

**When you need a thing
you pay for it whether
you buy it or NOT.**

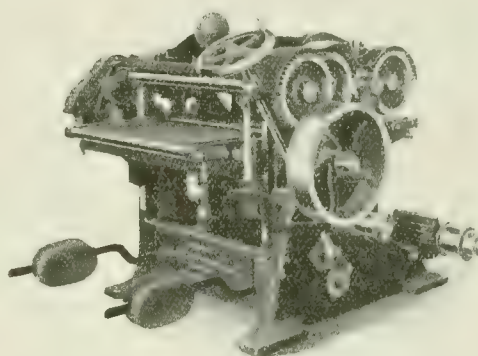
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shop or carpenter shop?
A few suggestions are
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for making patterns, sashes,
doors, furniture of all kinds,
and any article manufactured
from wood.



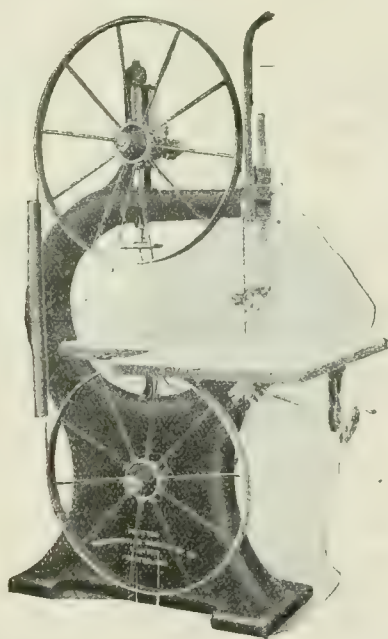
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A medium weight machine, very desirable for pattern shop work. Supplied with guard. Capacity up to 3" thick.



No. 121 Light Surface Planer

Planes either 20" or 24" wide x 8" thick. Much superior to a larger machine for running material within its limit.



**No. 132—36" Band Saw with
All-Steel Wheels**

Designed to meet requirements of Factory Inspector.



No. 143 Buzz Planer and Jointer

With round safety cylinder and guard to conform with safety requirements of Government Inspectors.

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Bowser & Co., S. F., Inc., Fort Wayne, Ind.

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GAUGES, HYDRAULIC

Taylor Instrument Co., Rochester, N.Y.

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Cleveland Twist Drill Co., Cleveland.
Garvin Machine Co., New York.
Illinois Tool Works, Chicago, Ill.
Morse Twist Drill & Machine Co., New Bedford.
Normac Machine Co., St. Catharines, Conn.
Peck, Stow & Wilcox Co., Southington, Conn.
Pratt & Whitney Co., Hartford, Conn.
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Toronto Tool Works, Toronto, Ont.
United Brass & Lead, Ltd., Toronto.
Wells Brothers Co. of Canada, Galt, Ont.
Worth Engineering Co., Toronto, Ont.

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Grant Gear Works, Boston, Mass.
Hamilton Gear & Machine Co., Toronto.
Victoria Foundry Co., Ottawa.
Hull Iron & Steel Foundries, Ltd., Hull, Que.
Illinois Tool Works, Chicago, Ill.
Jones & Glasco, Montreal.
Wm. Kennedy & Sons, Ltd., Owen Sound, Ont.
Philadelphia Gear Works, Philadelphia, Pa.
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MacGorm & Co., Montreal, Que.
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Williams & Wilson, Ltd., Montreal, Que.

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Willson & Co., Inc., T. A., Reading, Pa.

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Wilson & Co., J. C., Belleville, Ont.

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Rice Lewis & Son, Toronto, Ont.

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Standard Optical Co., Geneva, N.Y.
Strong, Kennard & Nutt Co., Cleveland, Ohio.
Willson & Co., Inc., T. A., Reading, Pa.

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Jones & Glasco, Montreal.
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Foss Mch. & Supply Co., The Geo. F., Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Katie Foundry, Galt, Ont.
Modern Tool Co., Erie, Pa.
Morse Twist Drill & Machine Co., New Bedford.
Niles-Bement-Pond Co., New York, N.Y.
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Grand Rapids Grinding Mach. Co., Grand Rapids, Mich.

Greenfield Tap & Die Corp., Greenfield, Mass.

Heald Machine Co., Worcester, Mass.

Landis Tool Co., Waynesboro, Pa.

LeBlond Mach. Tool Co., R. K., Cincinnati, O.

Norton Grinding Co., Worcester, Mass.

Perfect Machine Co., Galt, Ont.

Pratt & Whitney Co., Dundas, Ont.

Wells Bros. of Can., Galt, Ont.

Williams & Wilson, Limited, Montreal, Que.

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Modern Tool Co., Erie, Pa.

National-Acme Co., Cleveland, Ohio.

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Armstrong Bros. Tool Co., Chicago, Ill.

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Heald Machine Co., Worcester, Mass.

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Garvin Machine Co., New York.

Grand Rapids Grinding Mach. Co., Grand Rapids, Mich.

Greenfield Tap & Die Corp., Greenfield, Mass.

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Heald Machine Co., Worcester, Mass.

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Modern Tool Co., Erie, Pa.

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Perfect Machine Co., Galt, Ont.

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Ford-Smith Mach. Co., Hamilton, Ont.

The Geo. F. Foss Mch. & Supply Co., Montreal.

Grant Mfg. & Machine Co., Bridgeport, Conn.

Garlock-Walker Machinery Co., Toronto, Ont.

Greenfield Machine Co., Greenfield, Mass.

Independent Pneumatic Tool Co., Chicago, Ill.

United States Electrical Tool Co., Cincinnati, O.

A. R. Williams Machy. Co., Toronto.

Williams & Wilson, Ltd., Montreal, Que.

Wilkinson & Kompass, Hamilton, Ont.

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Garlock-Walker Machinery Co., Toronto, Ont.

Independent Pneumatic Tool Co., Chicago, Ill.

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Bristol Machine Tool Co., Bristol, Conn.

GRINDERS, TOOL AND HOLDER

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Blake & Johnson Co., Waterbury, Conn.

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Brown & Sharpe Mfg. Co., Providence, R.I.

Ford-Smith Machine Co., Hamilton, Ont.

Grand Rapids Grinding Mach. Co., Grand Rapids, Mich.

Greenfield Machine Co., Greenfield, Mass.

Greenfield Tap & Die Corp., Greenfield, Mass.

National-Acme Co., Cleveland, Ohio.

Tabor Mfg. Co., Philadelphia, Pa.

Wells Bros. of Can., Galt, Ont.

Wing & Son, J. E., Hamilton, Ont.

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Modern Tool Co., Erie, Pa.

Norton Grinding Co., Worcester, Mass.

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Heald Machine Co., Worcester, Mass.

Pratt & Whitney Co., Dundas, Ont.

Reed-Prentice Co., Worcester, Mass.

Wing & Son, J. E., Hamilton, Ont.

Gisholt Machine Co., Madison, Wis.

Norton Grinding Co., Worcester, Mass.

Williams & Wilson, Limited, Montreal, Que.

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Garvin Machine Co., New York.

Garlock-Walker Machinery Co., Toronto, Ont.

Greenfield Machine Co., Greenfield, Mass.

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LeBlond Mach. Tool Co., R. K., Cincinnati.

Niles-Bement-Pond Co., New York, N.Y.

Norton Grinding Co., Worcester, Mass.

Wisconsin Electric Co., Racine, Wis.

Williams & Wilson, Limited, Montreal, Que.

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Norton Grinding Co., Worcester, Mass.

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Blantonford Emery Wheel Co., Brantford, Canada.

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Ford-Smith Machine Co., Hamilton, Ont.

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Dennis Wire & Iron Works, London, Ontario.

New Britain Mach. Co., New Britain, Conn.

Page Steel & Wire Co., Adrian, Mich.

GUN TAPS

Greenfield Tap & Die Corp., Greenfield, Mass.

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Boker & Co., Inc., H., Montreal, Que.

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Diamond Saw & Stamping Works, Buffalo, N.Y.

Ford-Smith Machine Co., Hamilton, Ont.

The Geo. F. Foss Mch. & Supply Co., Montreal.

Fry's (London), Ltd., London, England.

Racine Tool & Machine Co., Racine, Wis.

Plews, Ltd., Winnipeg, Man.

Rice Lewis & Son, Toronto, Ont.

Simonds Mfg. Co., Fitchburg, Mass.

L. S. Starrett Co., Athol, Mass.

Standard Machy. & Supplies, Ltd., Montreal, Que.

Victor Saw Works, Ltd., Hamilton, Canada.

Wilkinson & Kompass, Hamilton, Ont.

Williams & Wilson, Limited, Montreal, Que.

HACK SAW FRAMES

Aikenhead Hardware Co., Toronto, Ont.

Can. Fairbanks-Morse Co., Montreal.

Ford-Smith Machine Co., Hamilton, Ont.

Garvin Machine Co., New York City.

Victor Saw Works, Hamilton, Ont.

Rice Lewis & Son, Toronto, Ont.

Wilkinson & Kompass, Hamilton, Ont.

Williams & Wilson, Limited, Montreal, Que.

HACK SAWS, POWER

Aikenhead Hardware Co., Toronto, Ont.

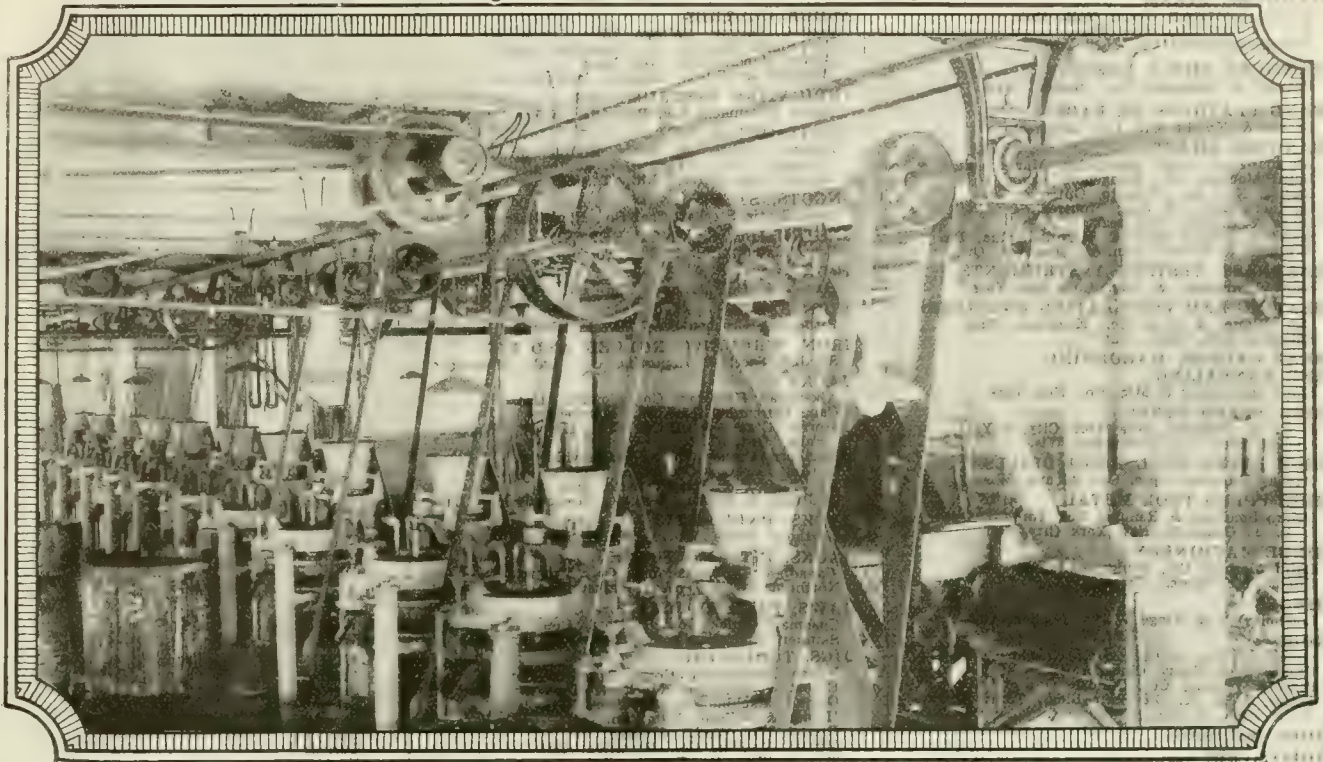
Can. Fairbanks-Morse Co., Montreal.

Diamond Saw & Stamping Works, Buffalo, N.Y.

The Geo. F. Foss Mch. & Supply Co., Montreal.

Ford-Smith Machine Co., Hamilton, Ont.

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BELT slip, air fanning, too heavy pulleys—account for losses of hundreds to thousands of dollars in many plants throughout the country.

Check these power and fuel losses. Reduce belt slip and windage, or air fanning, to a minimum. Make every ton of coal do full duty by installing American Steel Split Pulleys.

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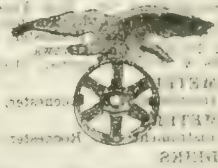
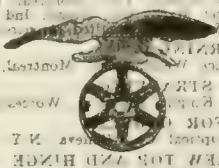
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Niles-Bement-Pond Co., New York.

HAMMERS, SHELL NOSING

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Baird Machine Co., Bridgeport, Conn.
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Garliner, Robt. & Son, Montreal.
Jones & Glasco, Montreal.
Standard Pressed Steel Co., Philadelphia, Pa.
Williams & Wilson, Limited, Montreal, Que.

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Sheldons, Ltd., Galt, Ont.

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AND ANNEALING
Shore Instrument & Mfg. Co., New York.

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General Steel, Co., Milwaukee, Wis.

HIGH SPEED TOOL ROOM DRILLS

Albany Hardware Spec. Co., Albany, Wis.

HIGH SPEED TOOL METAL

Deloro Smelting & Refining Co., Toronto, Ont.
J. F. A. Comstedt, New York City, N.Y.

HINGE MACHINERY

Baird Machine Co., Bridgeport, Conn.
Illinois Tool Works, Chicago, Ill.

HINGES

London Bolt & Hinge Works, London, Ont.

HOBS

Greenfield Tap & Die Corp., Greenfield, Mass.
Illinois Tool Works, Chicago, Ill.
Pratt & Whitney Co., Dundas, Ont.
Taylor, J. A. M., 318 Stair Bldg., Toronto, Ont.
Wells Bros. of Can., Galt, Ont.

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Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

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Can. Matthews Gravity Carrier Co., Toronto, Ont.
Dominion Bridge Co., Montreal, Quebec.
Jones & Glasco, Montreal.
MacGovern & Co., Montreal, Que.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville, Ont.
Williams & Wilson, Limited, Montreal, Que.

HOISTS, CHAIN AND PNEUMATIC

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Garlock-Walker Machinery Co., Toronto, Ont.
Ford Chain Block & Mfg., Philadelphia, Pa.
Independent Pneumatic Tool Co., Chicago, Ill.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville, Ont.
Wright Mfg. Co., Lisbon, Ohio.
Williams & Wilson, Limited, Montreal, Que.

HOISTS, ELECTRIC

Can. Link-Belt Co., Toronto, Ont.
Dominion Bridge Co., Montreal, Quebec.
Electric Steels & Metals, Ltd., Welland, Ont.
Kennedy & Sons, Owen Sound, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville, Ont.
Williams & Wilson, Limited, Montreal, Que.

HOLDERS, STEEL DIE FOR MARKING

Matthews, Jas. H. & Co., Pittsburgh, Pa.

HOLDERS, ELECTRIC

Electric Steels & Metals, Ltd., Welland, Ont.

HOPPERS

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Dominion Bridge Co., Montreal, Quebec.
Toronto Iron Works, Ltd., Toronto, Ont.

HOSE, PNEUMATIC

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Cleveland Pneumatic Tool Co. of Canada, Toronto
Garlock-Walker Machinery Co., Toronto, Ont.
Gutta Percha & Rubber, Ltd., Toronto, Can.
Independent Pneumatic Tool Co., Chicago, Ill.
Wells Bros. Co. of Canada, Galt, Ont.

HOSE, SAND BLAST

Gutta Percha & Rubber, Ltd., Toronto, Can.
Pangborn Corporation, Hagerstown, Md.

HOSE, STEAM

Gutta Percha & Rubber, Ltd., Toronto, Ont.

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Hydraulic Machy. Co., Ltd., Montreal, Que.
Metalwood Mfg. Co., Detroit, Mich.
Niles-Bement-Pond Co., New York.
William H. Ferrin, Ltd., Toronto.
West Tire Setter Co., Rochester, N.Y.
Victoria Foundry Co., Ottawa.
Williams & Wilson, Limited, Montreal, Que.

HYDROMETERS

Taylor Instrument Co., Rochester, N.Y.

HYGROMETERS

Taylor Instrument Co., Rochester, N.Y.

HYGRODEIKS

Taylor Instrument Co., Rochester, N.Y.

INDICATORS, SPEED

Aikenhead Hardware Co., Toronto, Ont.
Brown & Sherpe Mfg. Co., Providence, R. I.
L. S. Stuart Co., Athol, Mass.

INDEX CENTRES

Frederic C. Dickow, Chicago, Ill.
Ford-Smith Machine Co., Hamilton, Ont.
Garrin Machine Co., New York.
Williams & Wilson, Limited, Montreal, Que.

INDICATING INSTRUMENTS

Taylor Instrument Co., Rochester, N.Y.

INGOT METAL

Brown's Copper & Brass Rolling Mills, New Toronto, Ont.
United Brass & Lead Ltd., Toronto.

INGOTS, STEEL

Nova Scotia Steel & Coal Co., New Glasgow, N.S.

INSTRUMENTS, ENGINEERING

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Hanna & Co., M. A., Cleveland, O.

IRON SAND

Pittsburgh Crushed Steel Co., Pittsburgh, Pa.

IRON, WROUGHT, ROLLED AND PIG

Swedish Steel & Importing Co., Ltd., Montreal.

JACKS

Aikenhead Hardware Co., Toronto, Ont.
Can. Fairbanks-Morse Co., Montreal.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.
Norton, A. O., Castile, Que.
Rice, Lewis & Son, Toronto, Ont.
Williams & Wilson, Limited, Montreal, Que.

JACKS, PNEUMATIC

Northern Crane Works, Walkerville.

JACKS, PIT AND TRACK

Canadian Fairbanks-Morse Co., Montreal.
Northern Crane Works, Walkerville.

JAWS, FACE PLATE

Cushman Chuck Co., Hartford, Conn.
Skinner Chuck Co., New Britain, Conn.

JIGS, TOOLS, ETC.

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Elliott & Whitehall Mach. & Tool Co., Galt.
Gisholt Machine Co., Madison, Wis.
Homer & Wilson, Hamilton, Ont.
Illinois Tool Works, Chicago, Ill.
Marten Machine Co., Hamilton, Ont.
Toronto Tool Co., Toronto, Ont.
Normac Machine Co., St. Catharines, Ont.

JOURNAL WEDGES

Canada Foundries & Forgings, Ltd., Welland, Ont.

KEY SEATERS

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Garvin Machine Co., New York.
Morton Mfg. Co., Muskegon Heights, Mich.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

KEYS, MACHINE

Whitney Mfg. Co., Hartford, Conn.
Williams & Co., J. H., Brooklyn, N.Y.

KILNS

Can. Blower & Forge Co., Kitchener, Ont.
Kennedy & Sons, Wm., Owen Sound, Ont.
MacKinnon Steel Co., Sherbrooke, Que.
Sheldons, Limited, Galt, Ont.

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AND TESTING (SEE CHEMISTS)

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Northern Crane Works, Walkerville.

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Wood Turret Machine Co., Brazil, Ind.

Williams & Wilson, Limited, Montreal, Que.

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Hendey Machine Co., Torrington, Conn.
Williams & Co., J. H., Brooklyn, N.Y.

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LATHES, BORING

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Garlock-Walker Machinery Co., Toronto, Ont.
Hardinge Bros., Chicago, Ill.
New Britain Mach. Co., New Britain, Conn.
Pratt & Whitney Co., Dundas, Ont.
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Niles-Bement-Pond Co., New York.
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Walcott Lathe Co., Jackson, Mich.
Whitcomb-Blaissell Mach. Tool Co., Worcester, Mass.

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Can. Fairbanks-Morse Co., Montreal.
Garlock-Walker Machy. Co., Toronto, Ont.
Hardinge Bros., Inc., Chicago, Ill.
Plessisville Foundry, Plessisville, Que.
Roelofson Mach. & Tool Co., Toronto, Can.
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Foster Machine Co., Elkhart, Ind.
Garlock-Walker Machy. Co., Toronto, Ont.
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New Britain Machine Co., New Britain, Conn.
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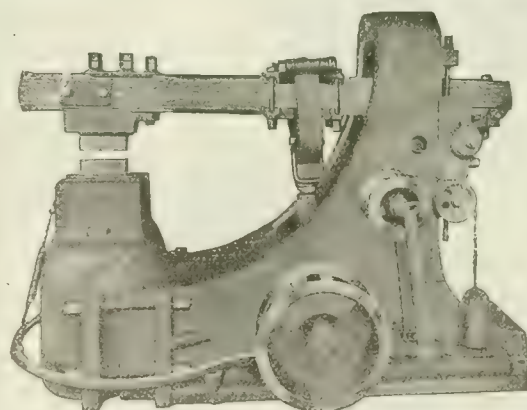
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Ford-Smith Mach. Co., Hamilton, Ont.
Fox Machine Co., Jackson, Mich.
Hardinge Bros., Inc., Chicago, Ill.
Hendey Mach. Co., Torrington, Conn.
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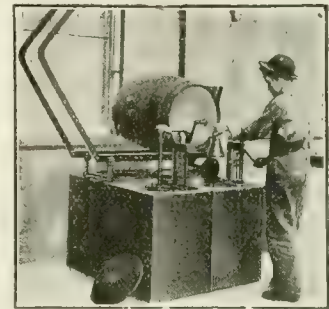
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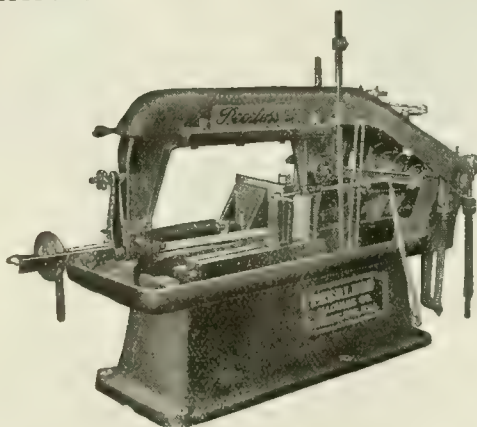
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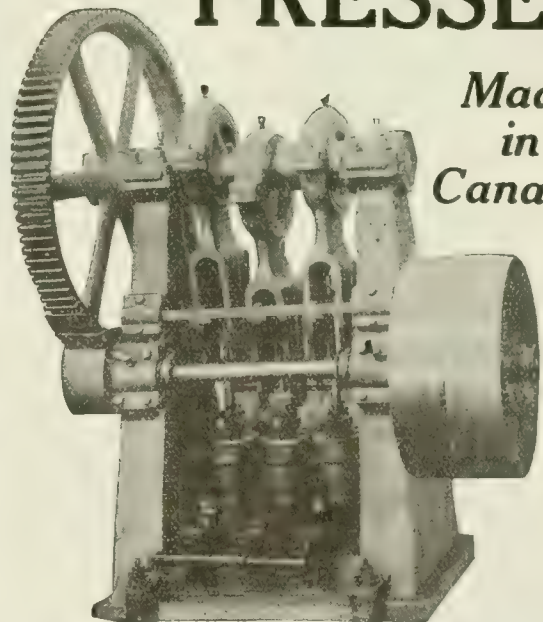
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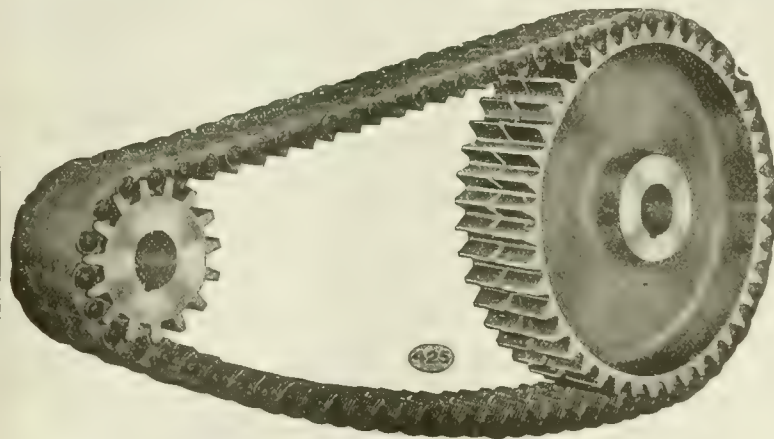
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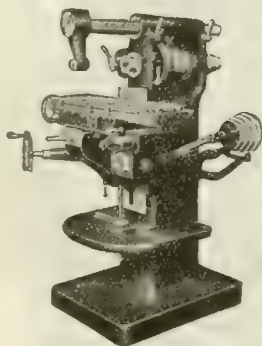
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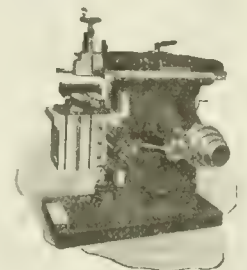


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"The Mysterious German Onions"

On nights when the German air raiders were out, they sent up strange, luminous balls behind their lines and anchored them above the clouds—globes of fire which could be seen for forty miles or more. What these "onions" were, or how they were kept in stationary position above the clouds, is still a profound mystery. The Allies never learned anything about them, but the Allies night bombing crews steered their course to the Rhineland by the luminous buoys thus provided.

What is known about the onions is told by Lieut. J. Vernon McKenzie in the course of an article, "Raiding the Rhineland," in MARCH MACLEAN'S. It is an intensely interesting article, telling all about the great reprisal campaign which implanted the fear of war in the German civilian heart.

"NO HOPE FOR THE WETS"

"Already the temperance forces are lined up to stop any possible break in the prohibition dam," writes J. K. Munro, in discussing what is going to happen at the coming session at Ottawa. He predicts that Union Government will hold together, but that the habit it has contracted of promising everything asked is going to make a lively session. He expects:

✓ Dry legislation at the earliest possible moment.	No change in the Divorce Law.
✓ The moral reform forces in control.	Tariff concessions made to the West.

*The March number, in fact, is full of live, up-to-the-minute features.
The famous Canadian Ace, Lieut.-Col. W. A. Bishop, is on the cover.*

Some of the Outstanding Articles and Stories are:

The Transformation (a new serial)—By Frederic S. Isham.

A Canadian King-Maker (the story of Lord Beaverbrook in Britain)—By Maurice Woods.

Fitting in the Returned Soldier—By George Pearson.
The Three Sapphires—By W. A. Fraser.

The Strange Adventure of the Nile Green Roadster—By Arthur Stringer.

Fakers—and Others—By E. Ward Smith.

Lend Me Your Title—By Onoto Watanna.

A Shady Deal—By Archie P. McKishnie.

The City of Lost Laughter—By Mary Josephine Benson.

The Voice of Canada Interpreted

A new department starts in this number given over to summarizing and presenting opinion in Canada on outstanding topics, as reflected in the press. In this issue the department is given over to a careful compilation of opinion on the problems of the returned soldier.

Events of the World in the Remaking

Germany Ready for Trade War
Three-Year Marriages in France
No Solution in Ireland Possible?
Germans Hoped to Raise Ships
Is Czar Still Alive?

Did Dr. Diesel Die?
The Secret British Ferry
The Poison That Didn't
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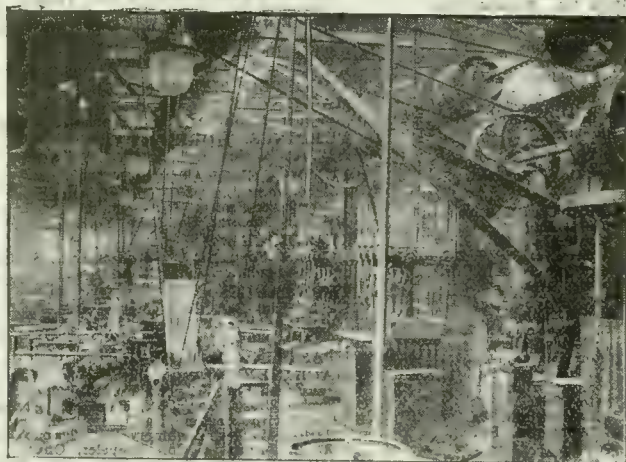
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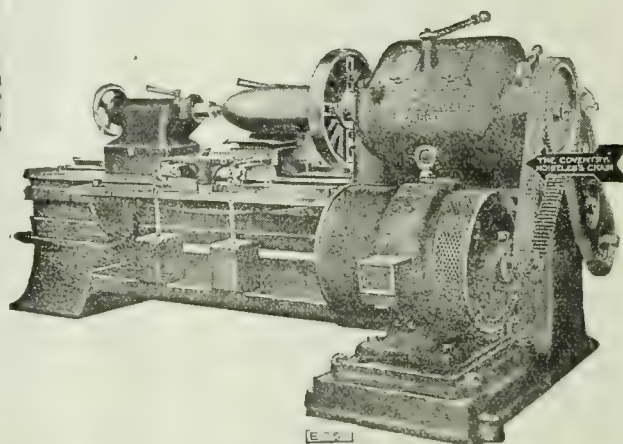
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AND MANUFACTURING NEWS

A weekly newspaper devoted to the machinery and manufacturing interests.

Vol. XXI.

TORONTO, MARCH 6, 1919

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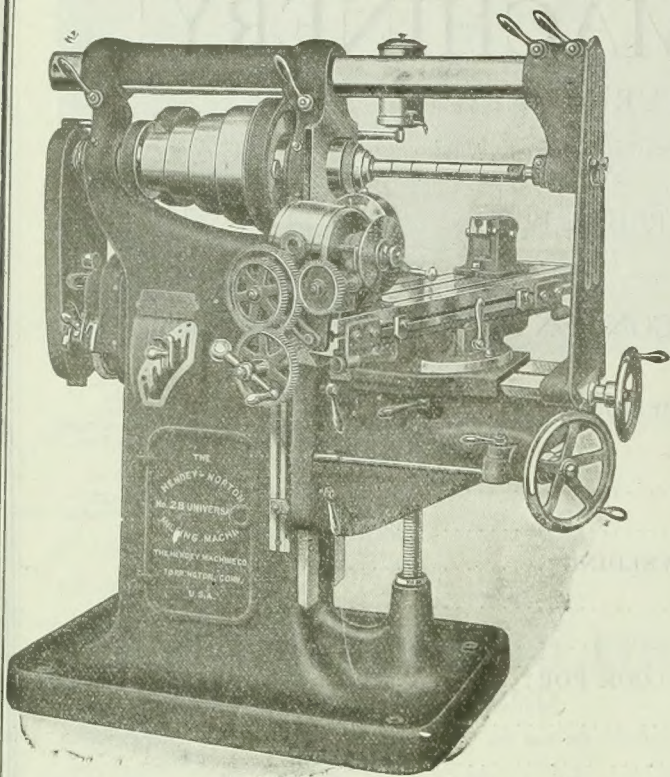
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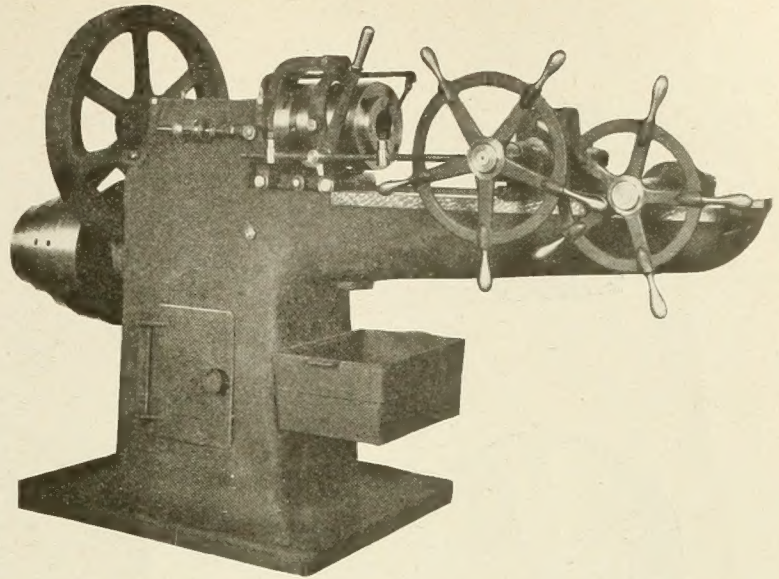
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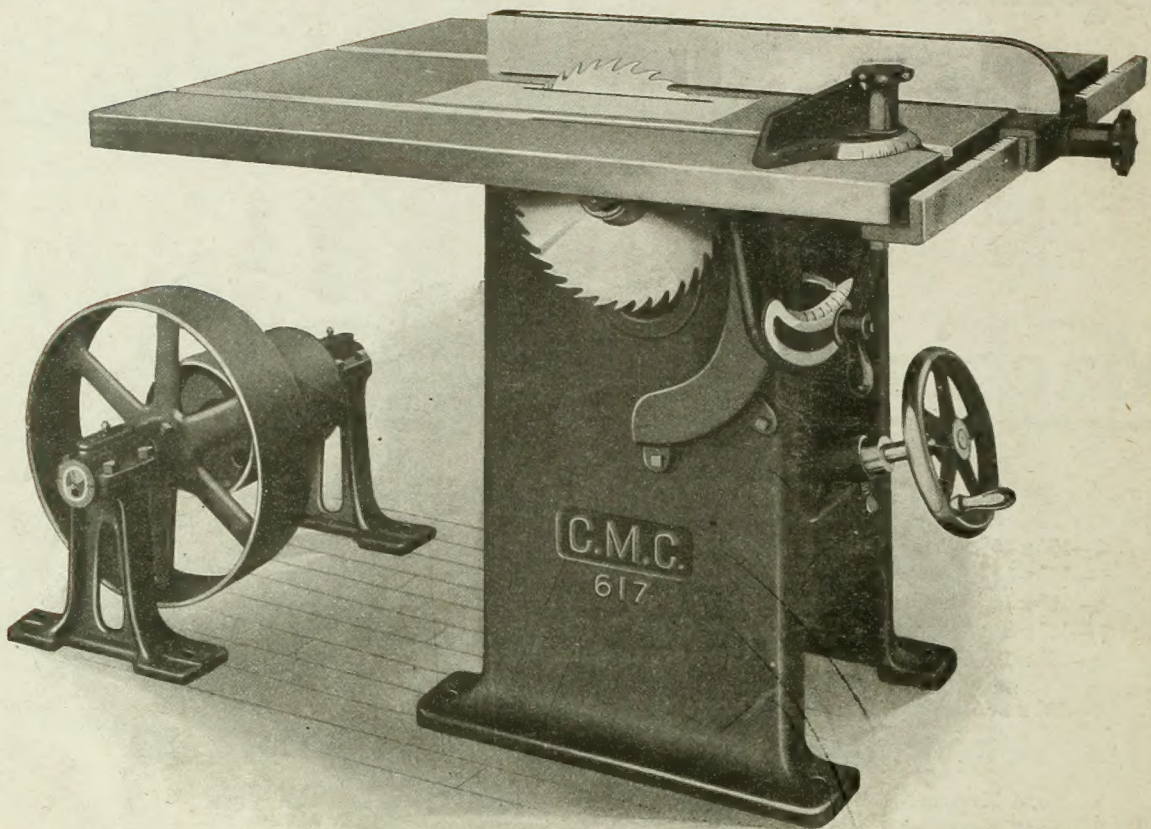
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